A Reproduced Copy

OF

(NASA-TM-88615) AGRICULTURAL SPECTRAL SIGNATURES: YUMA TEST SITE, MISSION 91-8, 4-7 FEBRUARY 1974 (NASA) 137 p

N86-71004

Unclas 00/43 00596

Reproduced for NASA by the

NASA Scientific and Technical Information Facility



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EARTH RESOURCES LABORATORY

@

MTF

AGRICULTURAL SPECTRAL SIGNATURES

YUMA TEST SITE

MISSION 91 - 8

FEBRUARY 4 - 7, 1974

Dr. R. H. GR4FFIN, II

REPORT NO. 102

15 MARCH 1974

INTRODUCTION

Basic to agricultural remote sensing applications is the study of crop signatures in the field at various growth stages and under various growing conditions.

A crop signature study is being conducted by the Earth Resources
Laboratory at the University of Arizona Agricultural Experiment Station,
Yuma, Arizona.

The purpose of the study is to determine areas of the spectrum and crop growth stages that would allow for the greatest probability of identification of each specific crop.

A layout of the Experiment Station is presented in Figure 1. The present study is being conducted in fields C-4 through C-14, identified in the figure as the "Signature Study" and the "Alkaloid Field Study".

The detailed plot plan for the spectral signature study is given in Figure 2. The numbers in the lower portion of each plot will be used throughout the study to reference the individual plots. Plots 7-11, 18-22, 24-33, and 40-44 will be planted in mid-February, 1974.

Figure 3 presents details of the alkaloid yield study area. Data points are indicated by the numbers 51-55 which will be used throughout the study to reference the individual plots. Due to the layout of the study, data cannot be obtained from treatment number 2.

Spectral data was taken with an Exotech model E20D filterwheel spectrometer mounted on a truck-boom 20 feet above the ground (Fig. 4 & 5). Three detectors were available; 1) Silicon (Si) with a wavelength range of 490-1290 nanometers was used at every field data point; 2) Lead Sulfide

(PbS) with a wavelength range of 900-3100 nanometers will be used at selected field data points; 3) Mercury-Cadmium-Telluride (HgCdTe) with a wavelength range of 4100-14400 nanometers will be used during the latter part of the study on selected field data points after calibration of the detector is completed.

A Hasselblad model 500 El with 80mm lens was mounted on the truck boom (Fig. 5) parallel to the spectrometer in order to photograph the spectrometer target. The spectrometer footprint was drawn on each photograph and vegetation ground cover percentage determined.

Incoming radiation was measured with an Eppley Pyranometer and recorded for each day that spectrometer data was taken (Fig. 6). Air temperature and relative humidity were recorded at two and five feet above the ground. Table 1 contains data taken at 1 hour intervals from 7 am to 6 pm on the days when spectrometer measurements were made.

Ground level photographs were taken of each sampling point along with observations on height, growth stage, and general crop conditions.

Spectral signatures from the Si and PbS detectors were obtained by ratioing the target reflectance against the incoming radiation to give percentage reflectance. The HgCdTe detector data will be presented as apparent temperature.

This is one of a series of data reports; each will contain the data collected at the Yuma, Arizona test site since issuance of the previous report. A final analysis and summary will be issued after the study is completed.

Data was collected February 4-7, 1974 from the following targets: cabbage, broccoli, onions, poppy - 1, poppy - 3, bare ground, cauliflower, carrot, chick peas, poppy - 2, poppy - 4, and poppy - 6.

FIELD NUMBERING SYSTEM

UNIVERSITY OF ARIZONA - YUMA VALLEY EXPERIMENT STATION

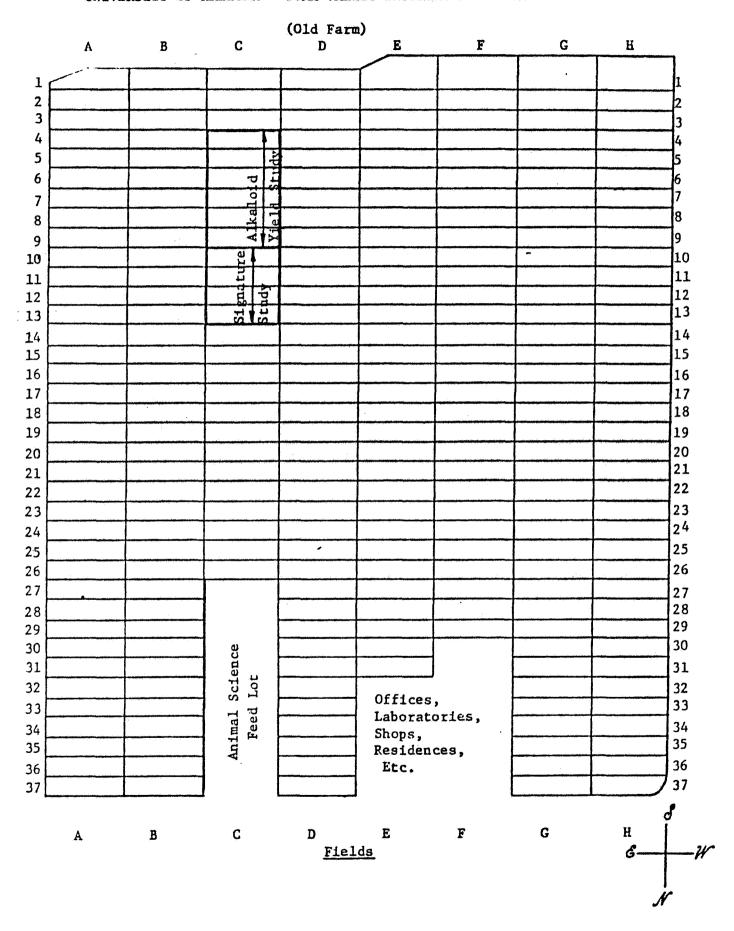
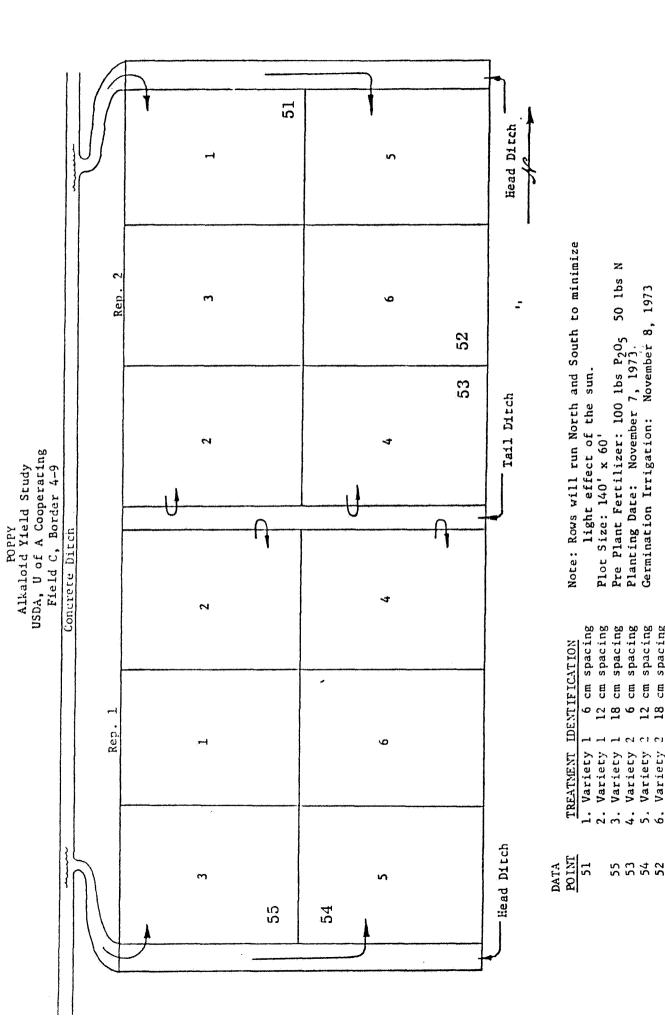


Figure 1 STATION PLAN

Spectral Signature Study USDA, NASA, Lockheed and U of A Cooperating Yuma, Ariz, 1973-74 Field C, Border 10-13

			Cre	te Ditch				
i					/(·	
	Cabbage 1 1/ Broccoli	Cauliflower 12 1/ Carrot		Cabbage 23		Cauliflower 34 L/ Carrot		Note: Row will r North and South to minimize li effect of the
	2 1/ Onions	13 1/ Chick Peas		24 1/ Onions		35 · 1/ Chick Peas		40'.6" x 26'.3 Pre Plant Fertili 100 1bà. P ₂ 0 ₅ 50 1bs. N
	3 1/ Poppy - 1	14 1/ Poppy - 2 15		25 1/ Poppy - 1 26		36 1/ Poppy - 2		1/ Code indicates Nov. planting 2/ Code indicates
	1/ Poppy - 3 5	1/ Poppy - 4 16		1/ Poppy - 3 27		1/ Poppy - 4 38		Feb. planting Treatment: 1 - Wet 30-35* 2 - Dry 60-65*
	Bare Ground	1/ Poppy - 6 17		1/ Poppy - 6 28		Bare Ground 39		* Moisture to be determined by Tensiometer
Road	Pinto Beans 7	2/ Poppy - 5 18	Road	2/ Pinto Beans 29		2/ Poppy - 5 40	Road	
	Z/ Chili 8	Z/ Tomato 19		2/ Chili 30		2/ Tomato 41		
	Water- melon	2/ Chayote 20		2/ Water- melon 31		2/ Chayote 42		
	Zucchini 10	2/ Banana Squash 21		2/ Zucchini 32		2/ Banana Squash 43		
	2/ Potato	2/ Sesame 22		2/ Sesame 33		<u>2/</u> Potato 44		

Figure 2 SIGNATURE STUDY PLAN



ALKALOID YIELD STUDY PLAN

Figure 3

12 cm spacing 18 cm spacing

Variety 2

Variety

Variety

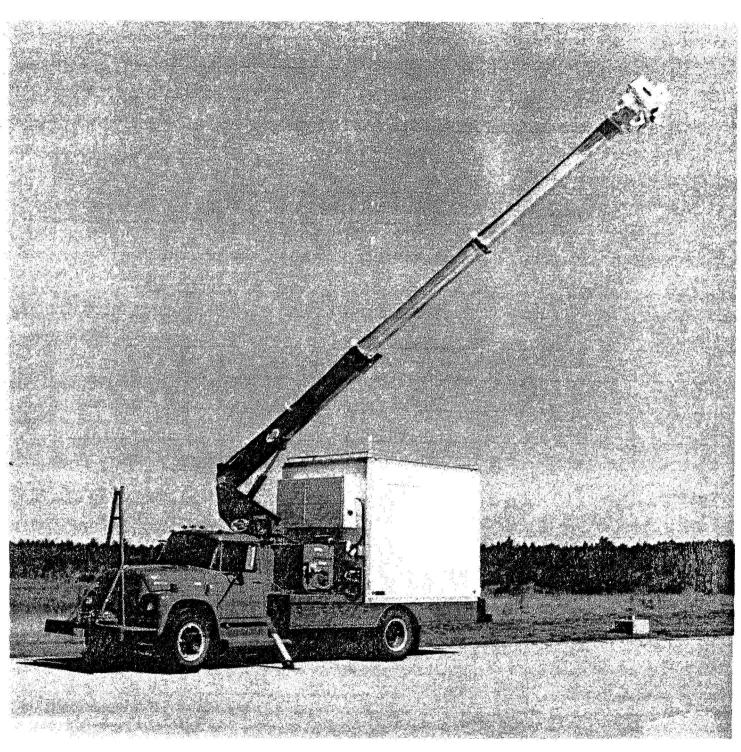


Figure 4 ERL REMOTE SENSING INSTRUMENTED VAN

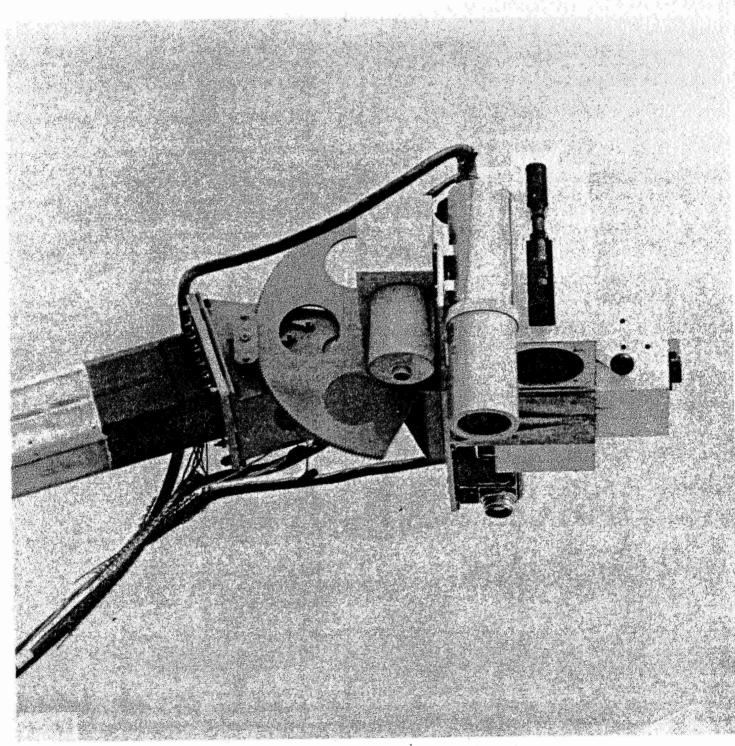
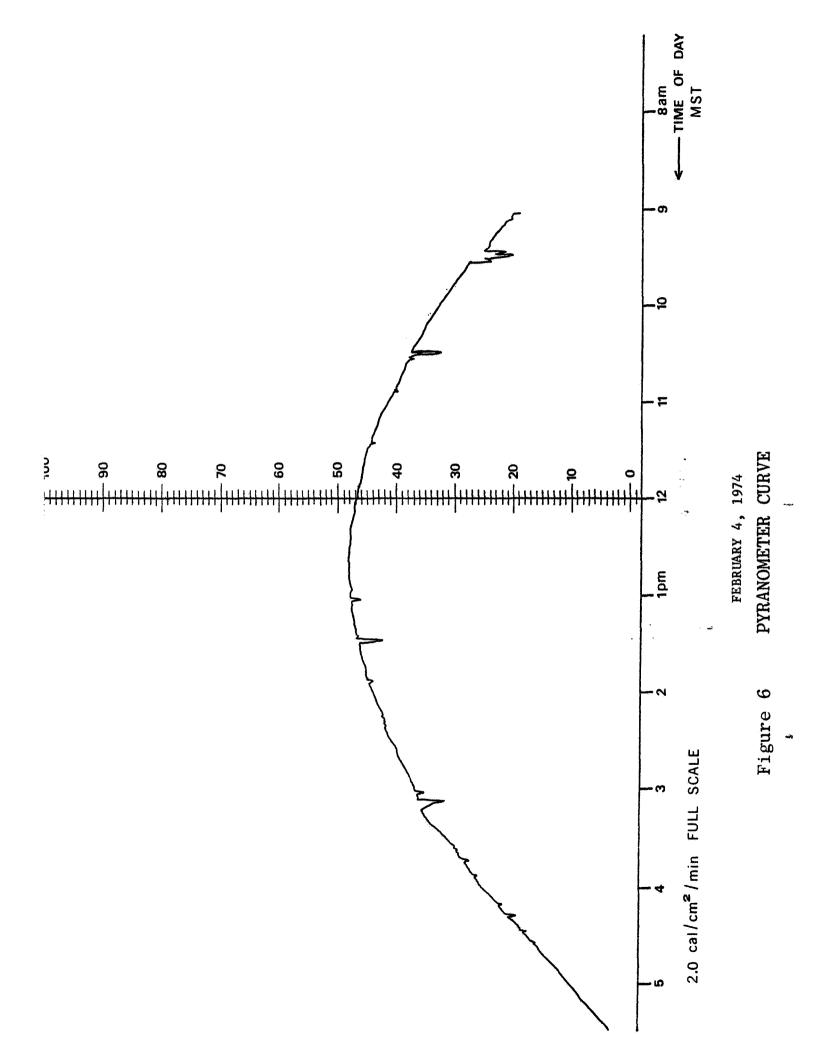
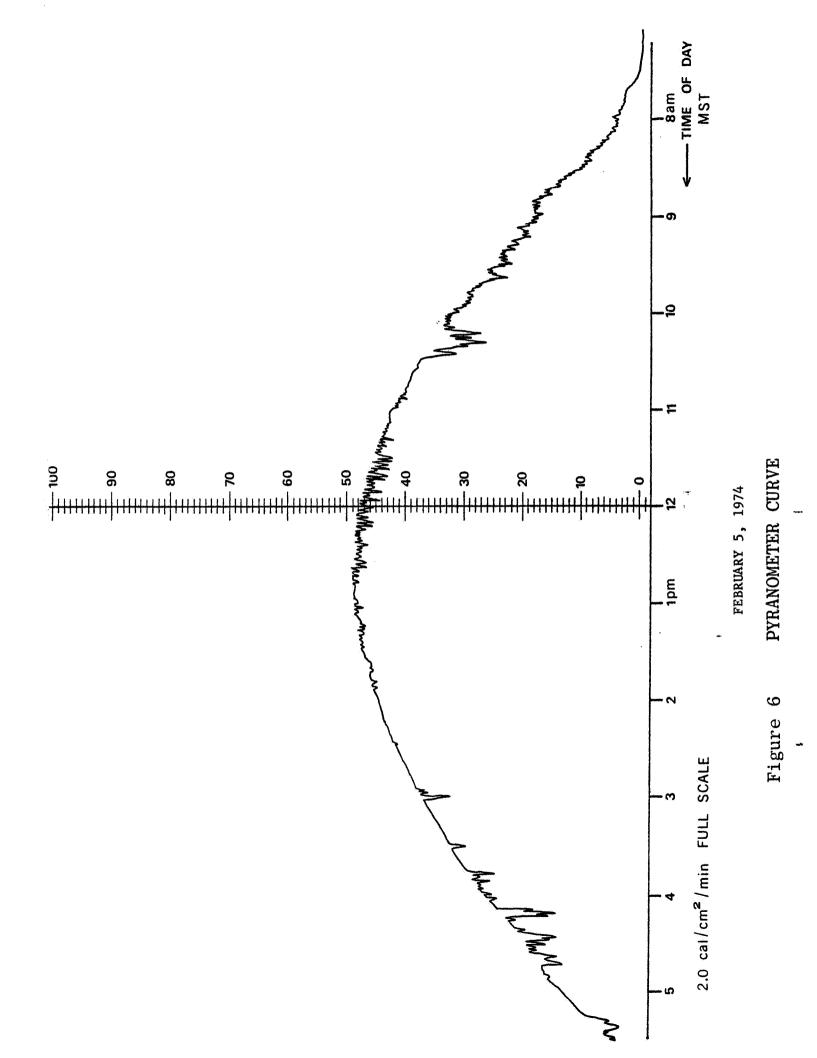


Figure 5 TRUCK BOOM MOUNTED SENSOR SYSTEM





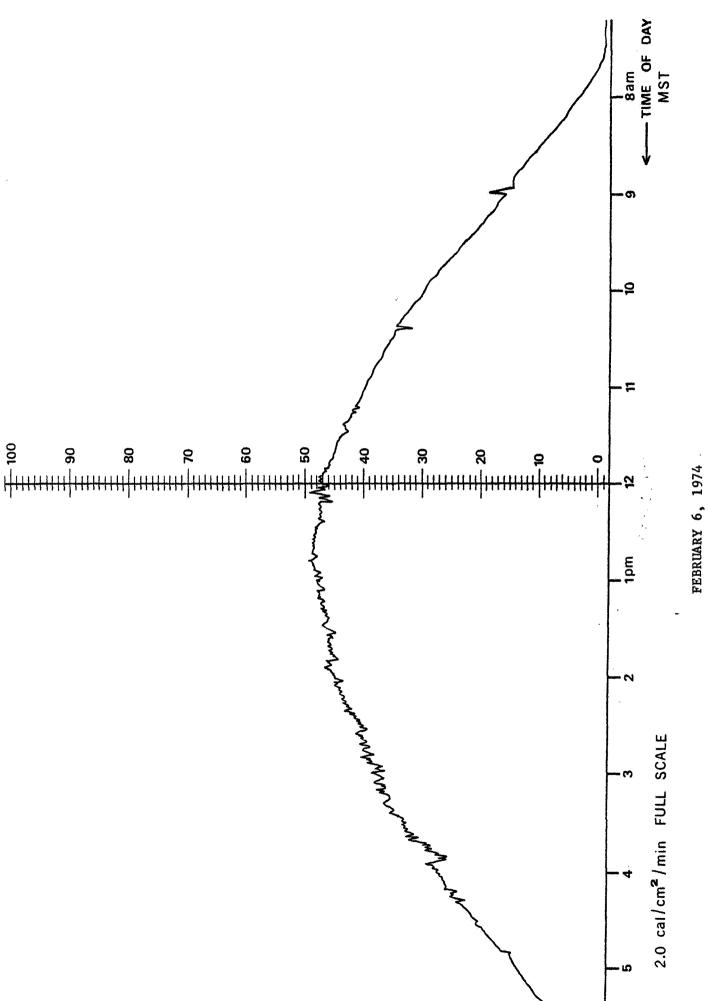


Figure 6 PYRANOMETER CURVE

Table 1 RELATIVE HUMIDITY and TEMPERATURE

FEBRUARY 4, 1974

T IME	2 FE	ET	5 FEET		
MST	R.H. %	TEMP. OF	R.H. %	TEMP. OF	
7 am		NO DATA			
8 am					
9 am					
10 am	34	64	30	62	
11 am	31	67	27	65	
12 am	28	71	24	68	
1 pm	25	73	22	71	
2 pm	24	75	22	72	
3 pm	22	75	21	72	
4 pm	24	74	22	72	
5 pm	26	73	24	72	
6 pm	34	63	26	68	

Table 1 RELATIVE HUMIDITY and TEMPERATURE

FEBRUARY 5, 1974

TIME	2 FE	5 FEET		
MST	R.H. %	TEMP.°F	R.H. %	TEMP. °F
7 am	86	34	96	36
8 am	86	36	76	37
9 am	60	48	50	46
10 am	44	60	30	54
11 am	32	64	30	62
12 am	32	65	29	62
1 pm	30	67	28	65
2 pm	28	68	26	66
3 pm	28	68	25	66
4 pm	28	67	25	65
5 pm	27	65	25	65
6 pm	28	58	25	60

Table 1 RELATIVE HUMIDITY and TEMPERATURE

FEBRUARY 6, 1974

TIM	Œ	2 FE	ET	5 FEET		
MST R.H. %		R.H. %	TEMP. OF	R.H. %	TEMP. °F	
7	am	44	46	38	46	
8	am	52	45	42	46	
9 ;	am	40	52	34	50	
10 4	am	36	53	32	53	
11 a	am	34	58	31	56	
12 a	am	32	59	30	56	
1 p	рm	31	60	29	58	
2 p	pm	29	61	27	58	
3 p	om	28	61	26	59	
4 p	om	28	61	26	59	
5 p	om	28	59	26	59	
6 p	m	28	57	26	57	

PLOT DETAILS

THIS SECTION CONTAINS FOR EACH PLOT THE FOLLOWING DETAILS:

- CROP HISTORY
- GROUND LEVEL PHOTO
- BORESIGHT PHOTO
- GROUND TRUTH DATA
- SPECTROMETER CURVE

PLOT NO. 1 CABBAGE

CROP HISTORY

Nov	6,	1973	Fertilized with 50 lbs N/Ac
Nov	7,	1973	Planted 2 rows on 40" beds with 12" spacing
Nov	9,	1973	Irrigated
Nov	12,	1973	First emergence
Nov	15,	1973	Up to a stand
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	17,	1973	Thinned to 12"
Dec	26,	1973	Cultivated
Jan	11,	1974	Sidedressed with 50 lbs N/Ac
Jan	15,	1974	Irrigated
Jan	28	1974	Hoed weeds
Jan	29	1974	Disced fallow portion
Feb	4,	1974	Irrigated

GROUND TRUTH DATA

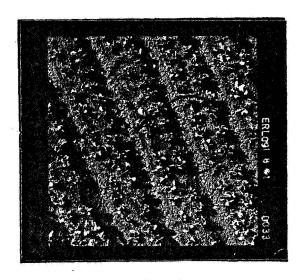
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
ec 12, 1973 ec 18, 1973	2 2.5	5 2	Moist Dry	Slightly	Thinned Dec 17, 1973
an 3, 1974 an 10, 1974 an 14, 1974 an 25, 1974	4 5 5 6	5 17 20 25	Moist 1.5" down Moist .5" down Wet Moist 1" down	Normal Normal	- - - 5% weeds, salt on rows -
in 30, 1974	7	25 25		Normal Normal	Jan 21, 1974 - Irrigated Feb 4, 1974
30 1, 131 ⁴	·				no weeds
		,			
• .					
•					

PLOT NO. 1 CABBAGE

FEBRUARY 4, 1974

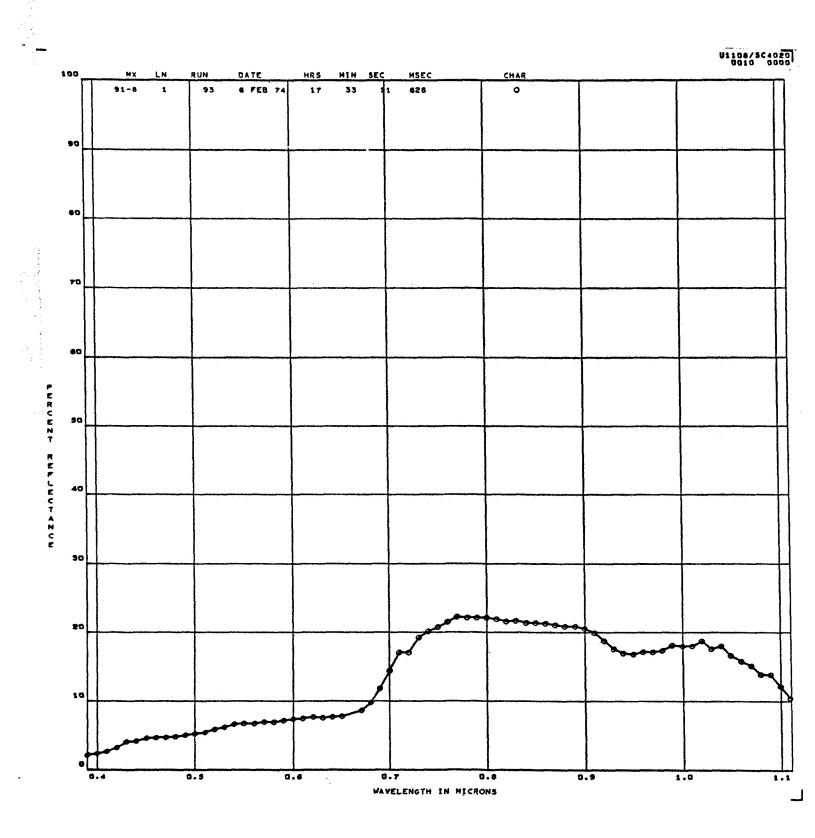


GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

SPECTROMETER SIGNATURE



PLOT NO. 2 BROCCOLI

CROP HISTORY

	Nov	6,	1973	Fertilized with 50 lbs N/Ac
	Nov	7,	1973	Planted 2 rows on 40" beds with 12" spacing
ēs.	Nov	9,	1973	Irrigated
	Nov	12,	1973	First emergence
	Nov	15,	1973	Up to a stand
-	Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
	Dec	17,	1973	Thinned to 14"
	Dec	26,	1973	Cultivated
	Jan	11,	1974	Sidedressed with 50 lbs N/Ac
	Jan	15,	1974	Irrigated
	Tan	28,	1974	Hoed weeds
Ċ			1974	Disced fallow portion
	Feb	4.	1974	Irrigated

BROCCOLI

GROUND TRUTH DATA

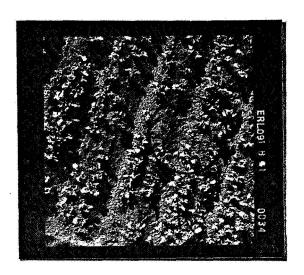
	ν.	HOOND II	WIN DAIR		
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
<u> </u>	(Tuches)	10	COMPTITONS		
Dec 12, 1973 Dec 18, 1973	2 2.5	5 2	Moist 1" down	Slightly	Thinned Dec 17, 1973
7- 0 107/	,	_		wilted	
Jan 3, 1974	4	5	Moist 1.5" down		-
Jan 10, 1974	5	15	Moist .5" down	•	•
Jan 14, 1974	6	18	Wet	Normal	-
Jan 25, 1974	8	22	Moist l"down	Normal	Tens. = 420, salt on rows Jan 21, 1974
Jan 30, 1974	9	24	Moist 2" down	Normal	-
Feb 7, 1974	10	30	Wet	Normal	Irrigated Feb 4, No weeds tens.=30
		:		;	
		٠			
		-			
		:			

PLOT NO. 2 BROCCOLI

FEBRUARY 4, 1974



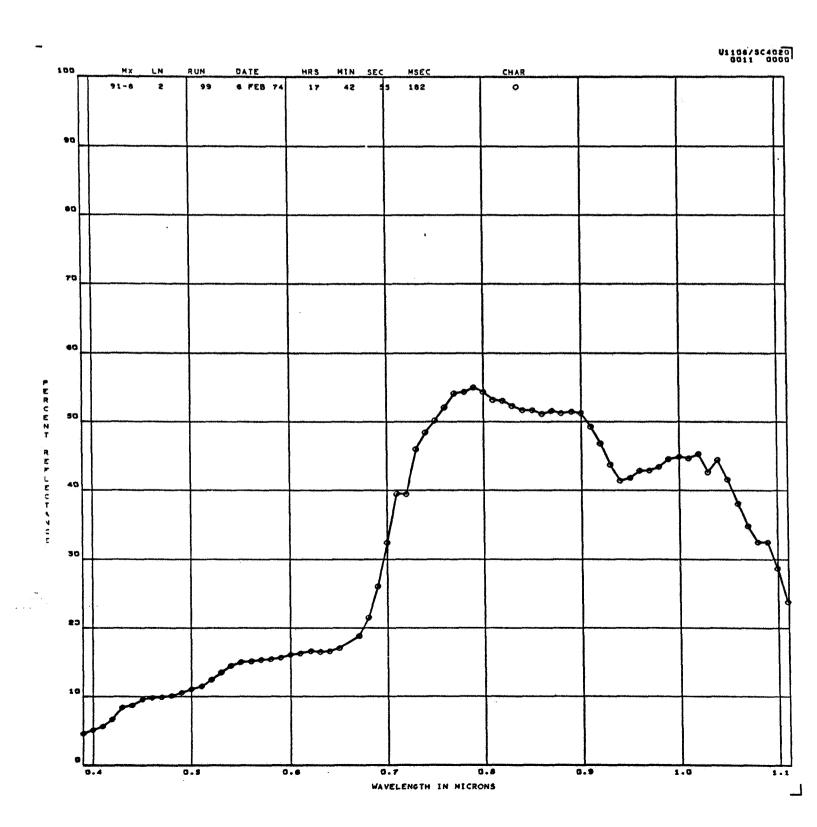
GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 2 BROCCOLI

SPECTROMETER SIGNATURE



PLOT NO. 3 ONIONS

CROP HISTORY

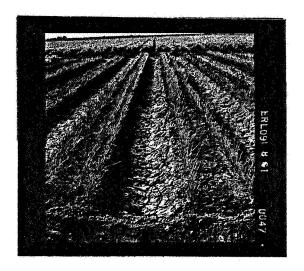
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9, 1973	Irrigated
Nov 21, 1973	Irrigated
Nov 26, 1973	First emergence
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Hand weeded - Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated

ONIONS

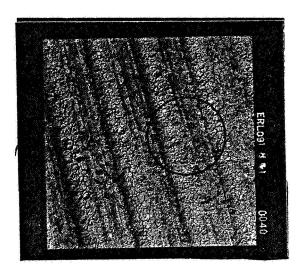
GROUND TRUTH DATA

31			· · · · · · · · · · · · · · · · · · ·		
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973 Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	- .5 3.5 3 4	1 1 2 10 8 15	Moist Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 1" down	Normal Wilted Cold-wilt Normal Normal	Weeded, Thinned Jan 14, 1974 Salt on rows Jan 21, 1974
Jan 30, 1974	7	15	Moist 2" down	Normal	_
'eb 7, 1974	8	17	Wet	Normal	Irrigated Feb 4,
				·	
				,	
-					
			٠,		
				:	

FEBRUARY 4, 1974



GROUND LEVEL

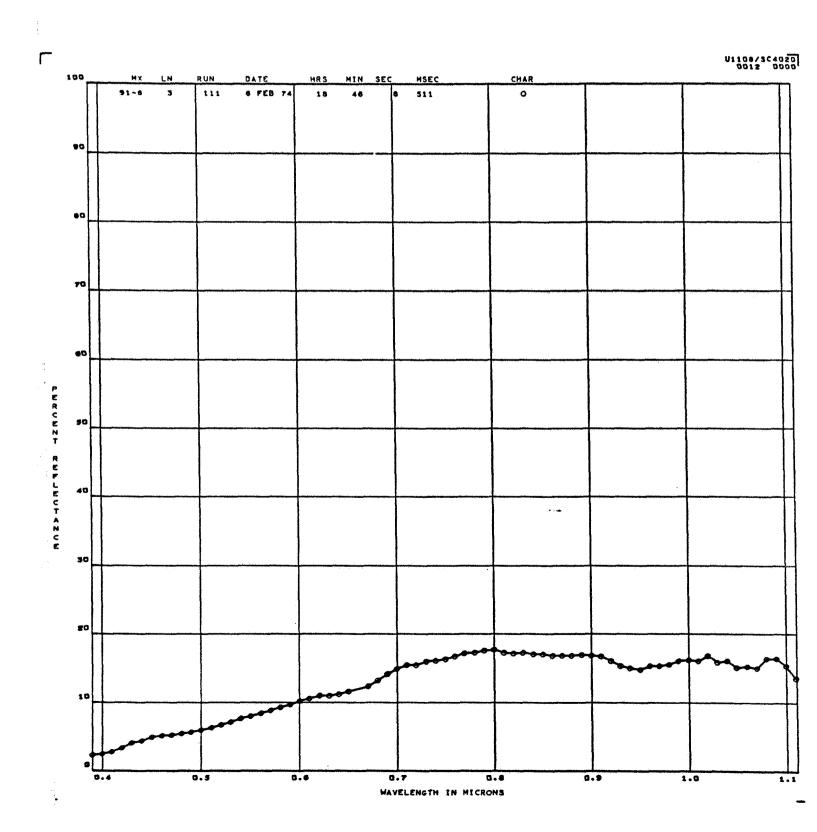


BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 3

ONIONS

SPECTROMETER SIGNATURE



POPPY - 1 (Acquisition No. B-40-6-3)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" between
	plants in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated

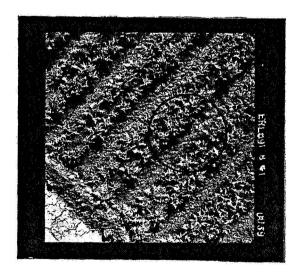
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
 Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974		COVER		CONDITION Wilted	Thinned Dec 17 Salt on rows Jan 21, 1974 Irrigated Feb 4, no weeds
1	· *				

FEBRUARY 4, 1974



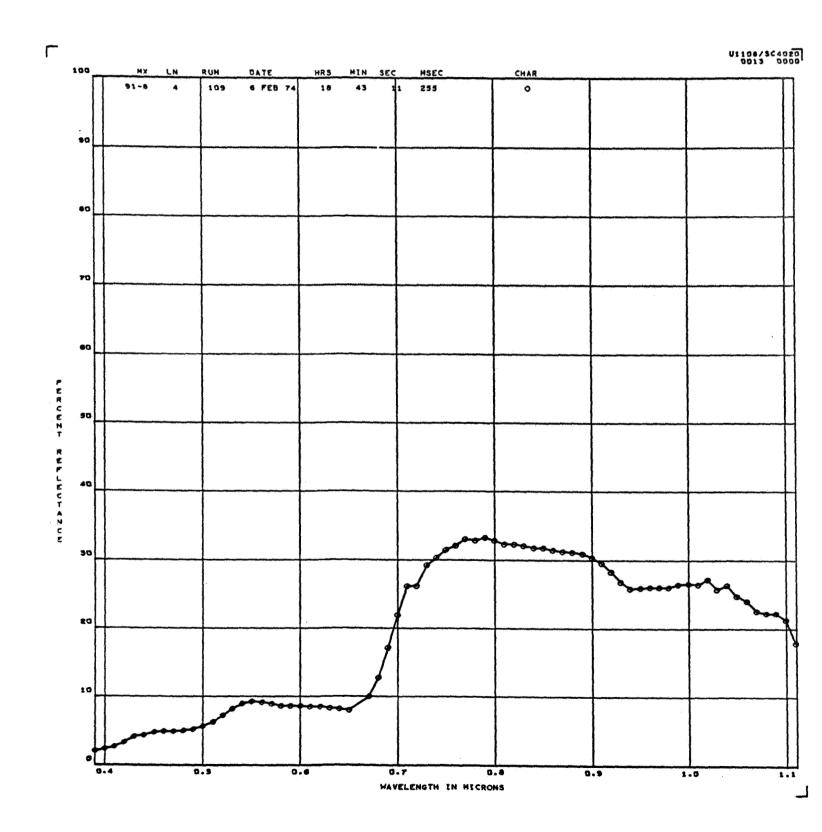
GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 4 POPPY-1

SPECTROMETER SIGNATURE



PLOT NO. 5

POPPY - 3 (Acquisition No. 371923)

CROP HISTORY

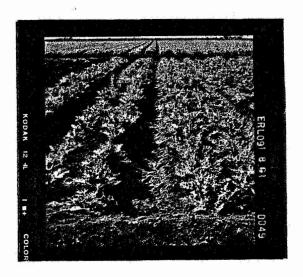
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" between
	plants in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Tan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
160 4, 1974	III I Bacad

POPPY-3 (Acquisition No. 371923)

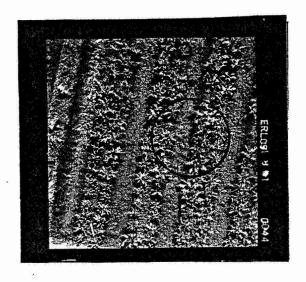
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	.5 - 2 3 4 5 8	1 12 22 25 25 30	Moist 1" down Moist 1.5" down Moist 1.5" down Wet Moist 1" down Moist 2" down Wet		Thinned Dec 17 Salt on rows Jan 21, 1974 Irrigated Feb 4, no weeds
		•			

FEBRUARY 4, 1974

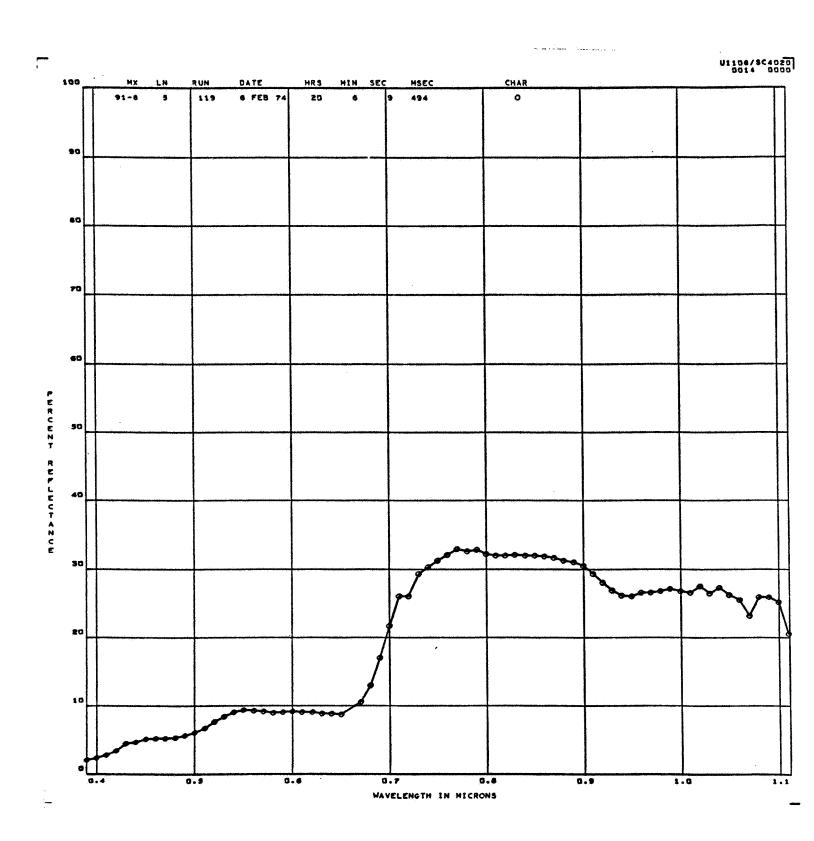


GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

SPECTROMETER SIGNATURE

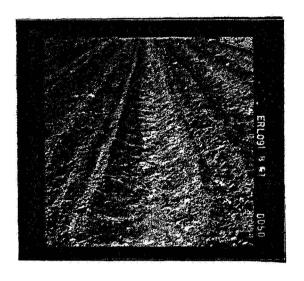


BARE GROUND (WET)

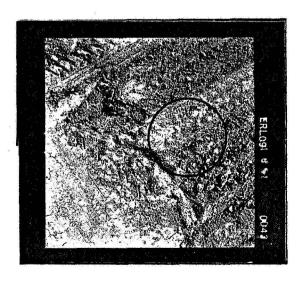
Nov	6,	1973	Fertilized with 50 lbs N/Ac
Dec	7,	1973	Fertilized with 50 lbs N/ac - Irrigated
Dec	26,	1973	Cultivated
Jan	28,	1974	Hoed weeds
Jan	29,	1974	Disced fallow portion
Feb	4,	1974	Irrigated

BARE GROUND (WET)?

	· -				
DATE	CROP HEIGHT	GROUND COVER	SURFACE	CROP CONDITION	COMMENTS
	(inches)	%	CONDITIONS	i e	
Dec 12, 1973 Dec 18, 1973	-	-	Moist Moist 1" down	-	-
Jan 3, 1974		_	Dry at 6"		
Jan 10, 1974	, -		bry at 0	-	1 . 7 .
	<u>-</u>	-	Moist .5" down	•	No weeds
Jan 14, 1974		-	Dry	•	No weeds
Jan 25, 1974	-	0	Moist 1" down		No weeds Salt on rows
•				ł	Jan 21, 1974
Jan 30, 1974	_	,	Dry	_	-
Feb 7, 1974	_		Dry	_	No weeds
,,,		-		į	1
		·			
			,		
			; :		
i					
			!;		
			1		
				•	
_					
		:			
		Ì			
		,			
	•				
	1				
	1	1			
	I	1	I		
	1	j	1		
	1	1			



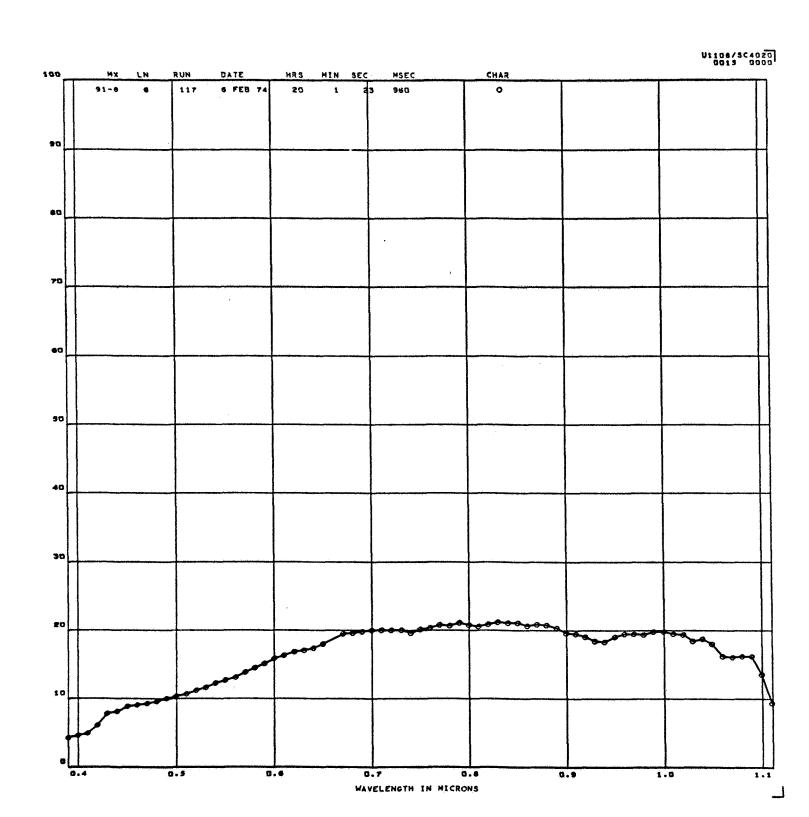
GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 6

BARE GROUND (Wet)



PLOT NO. 12 CAULIFLOWER .

Nov 6,	1973	Fertilized with 50 lbs N/Ac
Nov 7,	1973	Planted 2 rows on 40" beds with 12" spacing and 24"
		spacing in drill
Nov 9,	1973	Irrigated
Nov 13,	1973	First emergence
Nov 15,	1973	Up to a stand
Dec 7,	1973	Fertilized with 50 lbs N /Ac - Irrigated
Dec 17,	1973	Thinned to 24"
Dec 26,	1973	Cultivated
Jan 11,	1974	Sidedressed with 50 lbs N /Ac
Jan 15,	1974	Irrigated
Jan 28,	1974	Hoed weeds
Jan 29,	1974	Disced fallow portion
Feb 4,		Irrigated

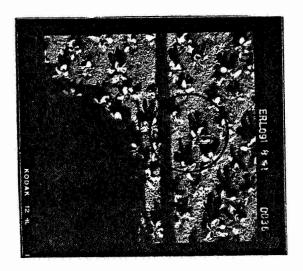
PLOT NO. 12

	_				
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973 Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	1 2.5 4 6 6.5 9	6 2 - 12 15 30 25 25	Moist Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 1" down Moist 2" down Wet	Normal Wilted Cold-wilted Normal Normal Normal	Thinned Dec 17 Few weeds 5% weeds Salt on row Jan 21, 1974 Irrigated Feb 4, no weeds
				!	
-					
·					

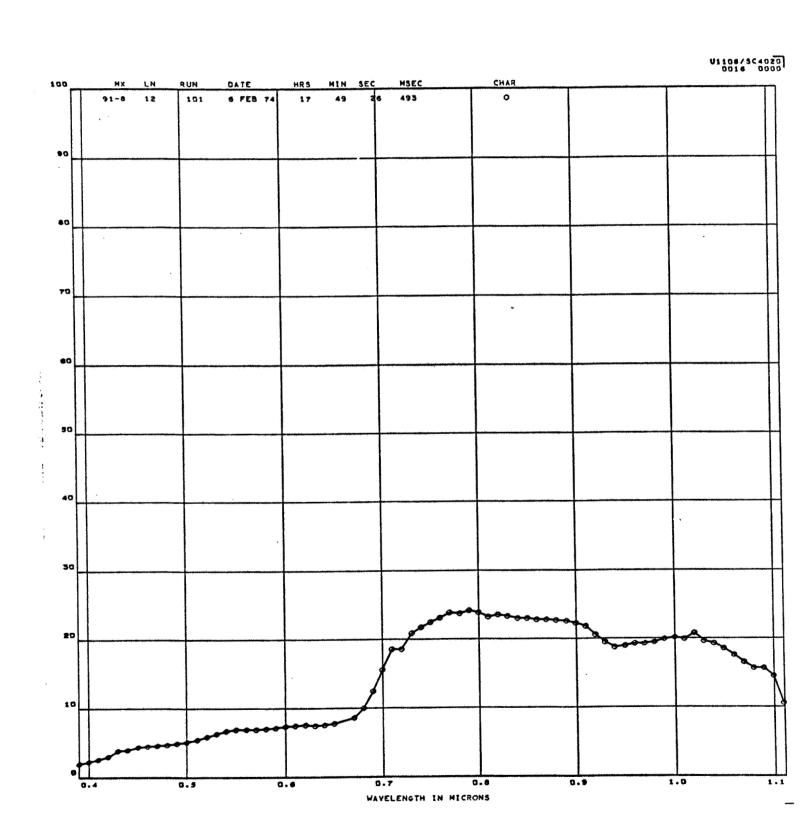
PLOT NO. 12 CAULIFLOWER



GROUND LEVEL



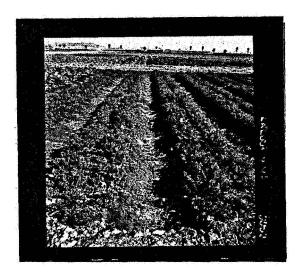
BORESIGHT
Circle represents spectrometer footprint



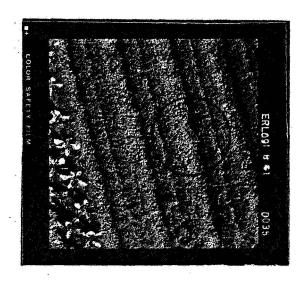
PLOT NO. 13 CARROT

Nov 6	, 1973	Fertilized with 50 lbs N/Ac
Nov 7	, 19 73	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9	, 1973	Irrigated
Nov 21	, 197 3	Irrigated
Nov 26	, 1973	First emergence
Dec 7	, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26	, 1973	Cultivated
Jan 11	, 1974	Sidedressed with 50 lbs N/Ac
Jan 15	, 1974	Irrigated - Sprayed with Lorax
Jan 28	. 1974	Hoed weeds
Jan 29	, 1974	Disced fallow portion
Feb 4	, 1974	Irrigated

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973 Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	HEIGHT	COVER	SURFACE	CONDITION	1% Weeds 10% Weeds 7% Weeds 1% Weeds Tens.= 12 Salt on rows Jan 21, 1974 Irrigated Feb 4, no weeds, tens.= 34
				·	

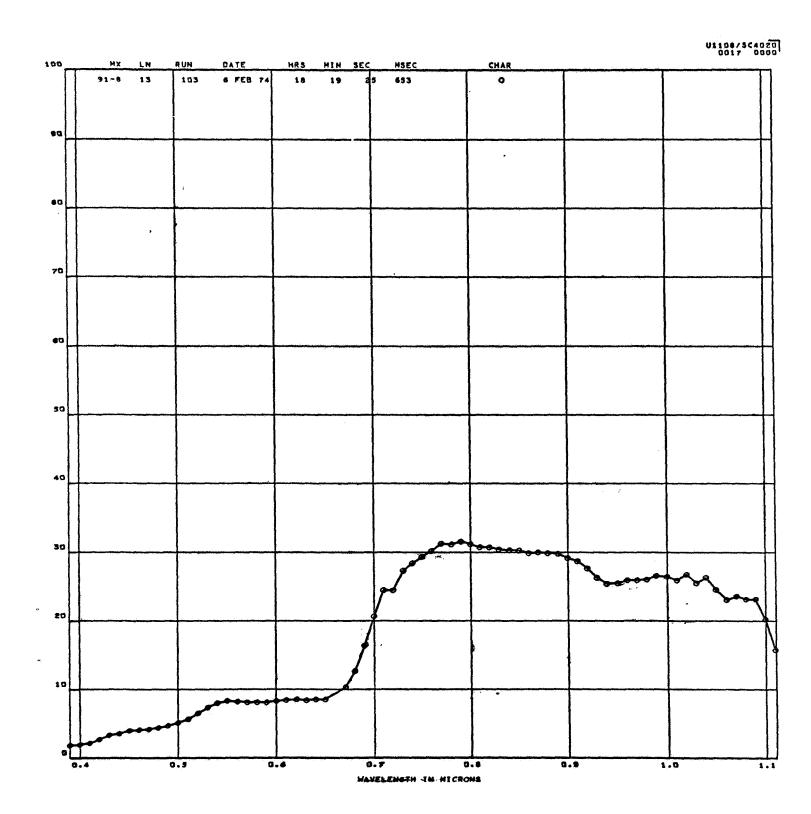


GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 13 CARROT

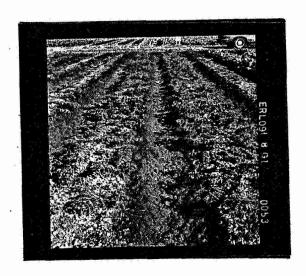


PLOT NO. 14 CHICK PEAS

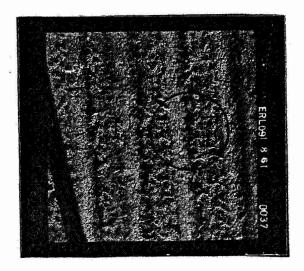
Nov	6,	1973	Fertilized with 50 lbs N/Ac
Dec	4,	1973	Planted 2 rows on 40" beds with 12" spacing
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	26,	1973	First emergence - Cultivated
Jan	7,	1974	Poor stand
Jan	11,	1974	Sidedressed with 50 1bs N/Ac
Jan	15,	1974	Transplanted for proper stand - Irrigated
Jan	28,	1974	Hoed weeds
Jan	29,	1974	Disced fallow portion
Feb	4,	1974	Irrigated
			•

			~				
DA	ATE	,	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec Jan Jan Jan Jan	12, 18, 3, 10, 14, 25, 30, 7, 1	1973 1974 1974 1974 1974				- Normal	Poor stand Transplanted for good stand Salt on rows - Jan 21, 1974 Irrigated Feb 4, no weeds
		į.	I				

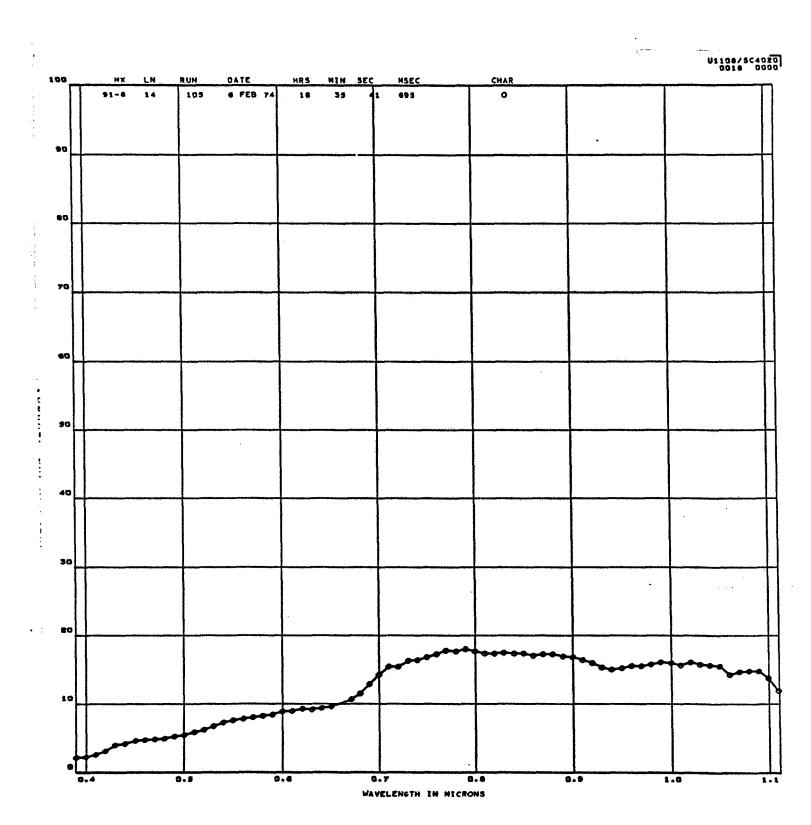
PLOT NO. 14 CHICK PEAS



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



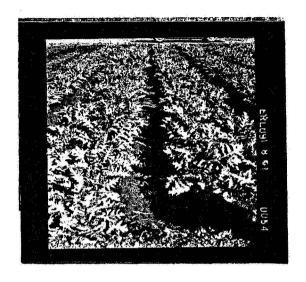
PLOT NO. 15

POPPY - 2 (Acquisition No. M-89)

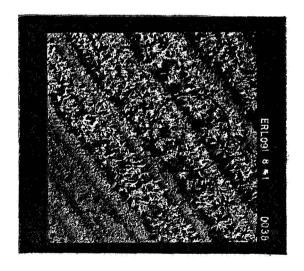
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9"
	spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28. 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated

POPPY-2 (Acquisition No. M-89)

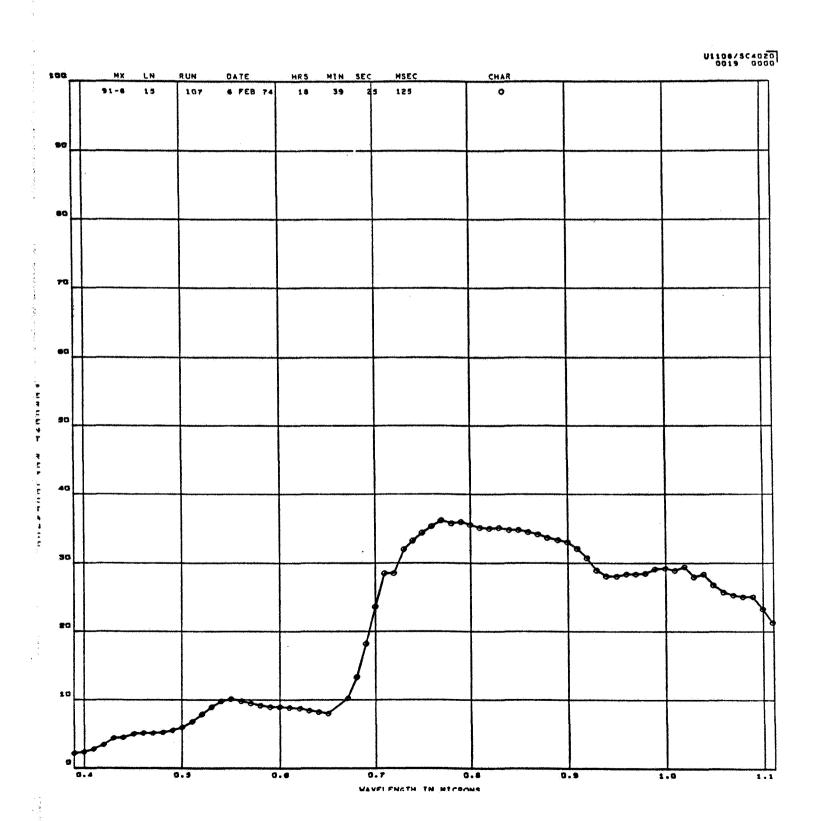
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974					Thinned Dec 17 Salt on rows - Jan 21, 1974, tens. =15 Irrigated Feb 4, no weeds, tens. =38



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



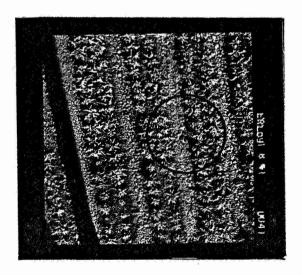
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9"
	spacing in drill
Nov 9, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated

POPPY-4 (Mixture of 1,2,3)

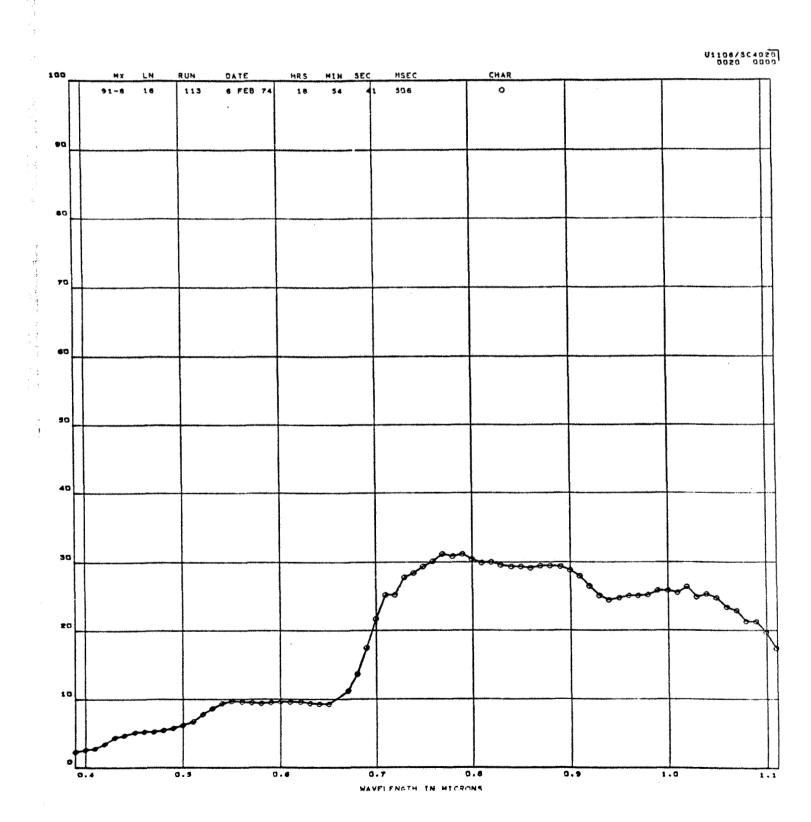
	•				
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
 Dec 12, 1973 Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	.5 1 1 2 2.5 4 6	1 3 10 20 20 23	Moist Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 1" down Moist 2" down Wet		Thinned Dec 12 Salt on rows - Jan 21, 1974 Irrigated Feb 4,
					no weeds
	-				
				·	



GROUND LEVEL

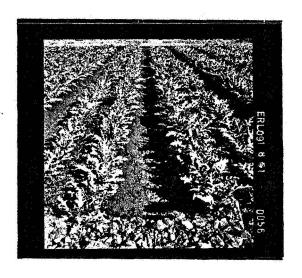


BORESIGHT
Circle represents spectrometer footprint

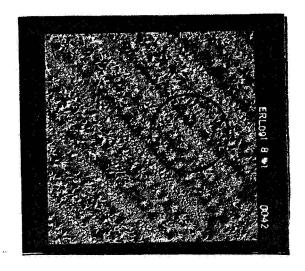


Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29. 1974 Feb 4, 1974	Disced fallow portion Irrigated

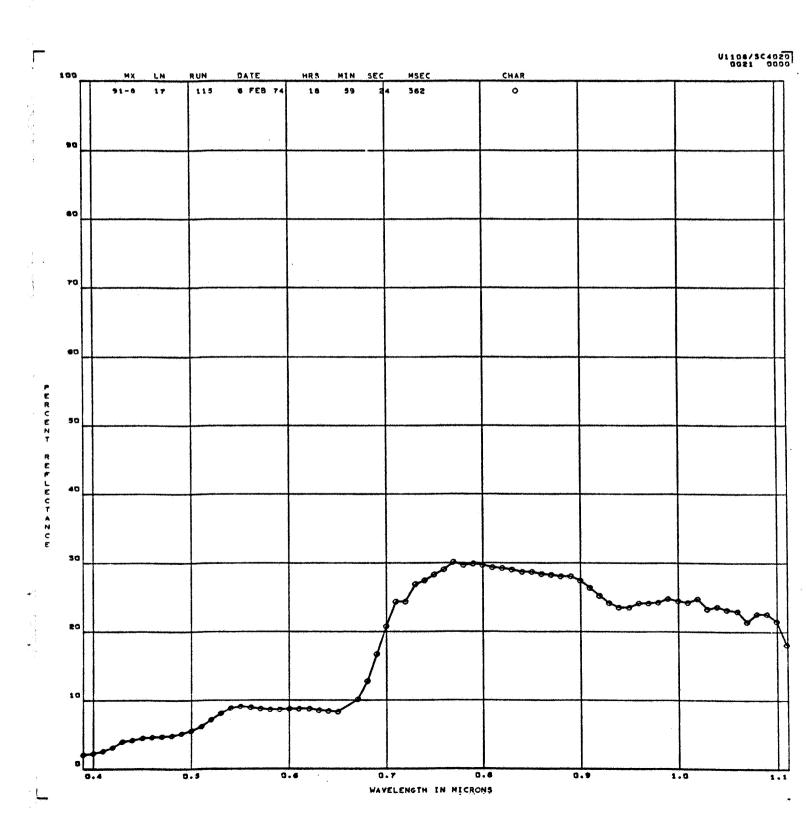
DATE	CROP	GROUND	GROUND	CROP	, COMMENTS
	HEIGHT	COVER	SURFACE	CONDITION	
	(inches)	%	CONDITIONS		
D- 10 1070				••••	
Dec 18, 1973 Jan 3, 1974	1 1-2	1 4	Moist 1" down Moist 1.5" down	Wilted Normal	Thinned Dec 12
Jan 10, 1974	2	10	Moist .5" down	Normal Normal	
Jan 14, 1974	2.5	20	Wet	Normal	-
Jan 25, 1974	5	22	Moist 1" down	Normal.	Salt on rows
					Jan 21, 1974
Jan 30, 1974	6	35	Moist 2" down	Normal	-
Feb 7, 1974	7	30	Wet	Normal	No weeds
			1:		
			'		
:					
		•			
1					
			!		
				:	
			;		
		Į			
* ** ;					
Ne.					
		1			
			l		
	1		ł		
	į				
	ļ		1		
	1	1			



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

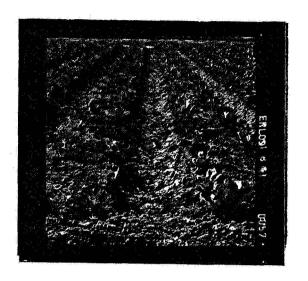


PLOT NO. 23 CABBAGE

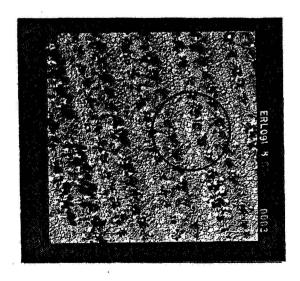
Nov 6, 1	L973	Fertilized with 50 lbs N/Ac
Nov 7, 1	L973	Planted 2 rows on 40" beds with 12" spacing
Nov 9, 1	L9 73	Irrigated
Nov 12, 1	L973	First emergence
Nov 15, 1		Up to a stand
Dec 7, 1	L973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1	L973	Thinned to 12"
Dec 26, 1	L973	Cultivated
Jan 11, 1	L974	Sidedressed with 50 lbs N/Ac
Jan 15, 1	L974	Irrigated
Jan 28. 1	974	Hoed weeds
Jan 29, 1	.974	Disced fallow portion

CABBAGE

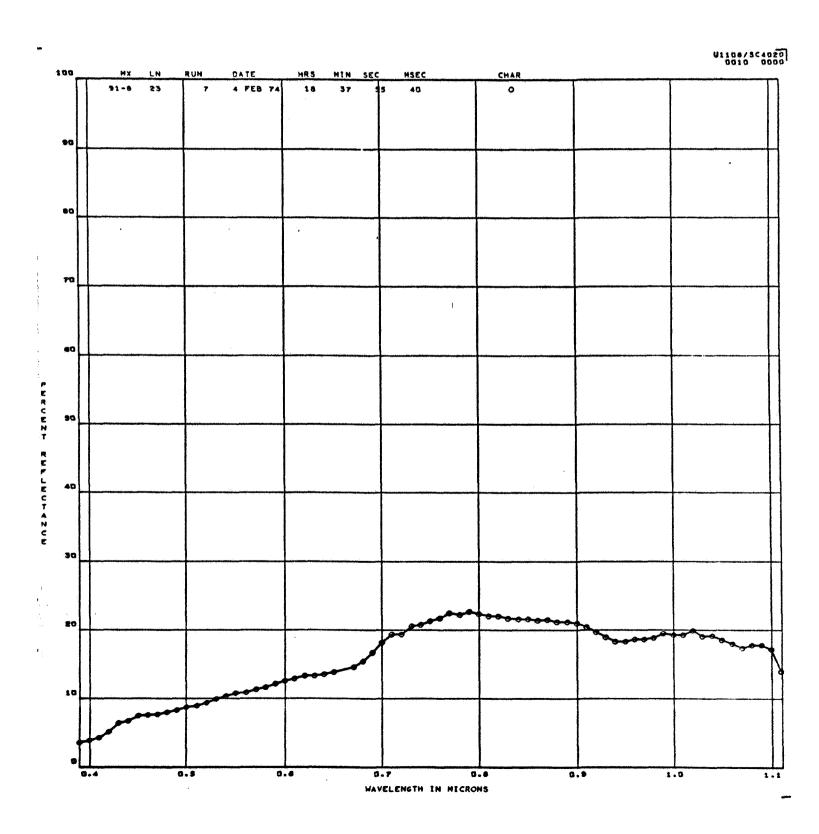
GROUND IRUIN DAIR					
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Bec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	1 3-4 5 5 5 6	1 2 17 20 17 15 20	Moist 1" down Moist 1.5" down Moist 3" down Moist 2" down Dry	Wilted Normal	Thinned Dec 17



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

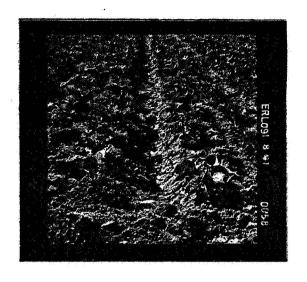


PLOT NO. 24 BROCCOLI

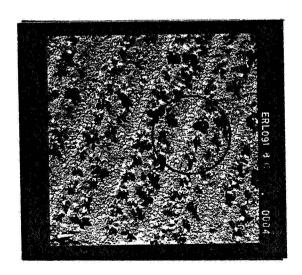
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing
Nov 9, 1973	Irrigated
Nov 12, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 14"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion

BROCCOLI

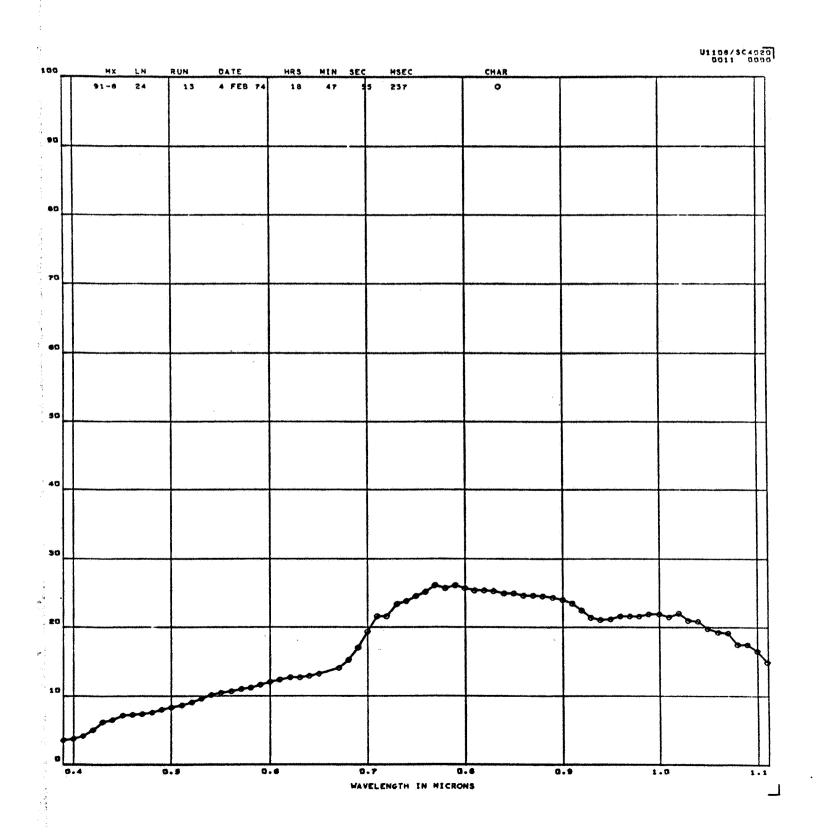
	•	WOOND II	WIN DAIR		
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1 3 5 6 5	1 1 15 18 17	Moist 1" down Moist 1.5" down Moist 1.5" down Wet Moist 3" down		Thinned Dec 17 Tens.= 3 Weeds Salt on rows Jan 21, 1974
Jan 30, 1974 Feb 7, 1974	7 8	17 20	Moist 2" down Dry	Normal Normal	No weeds, tens.=30



GROUND LEVEL



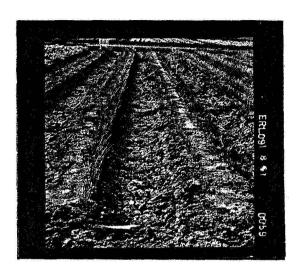
BORESIGHT
Circle represents spectrometer footprint



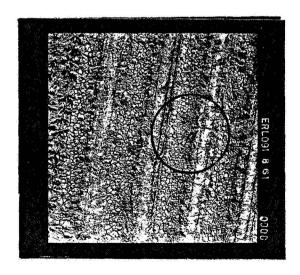
PLOT NO. 25 ONIONS

Nov	6,	1973	Fertilized with 50 lbs N/Ac
Nov	7,	1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov	9,	1973	Irrigated
Nov	21,	1973	Irrigated
Nov	26,	1973	First emergence
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	26,	1973	Cultivated
Jan	11,	1974	Sidedressed with 50 lbs N/Ac
Jan	15,	1974	Hand weeded - Irrigated
Jan	28,	1974	Hoed weeds
Jan	29,	1974	Disced fallow portion

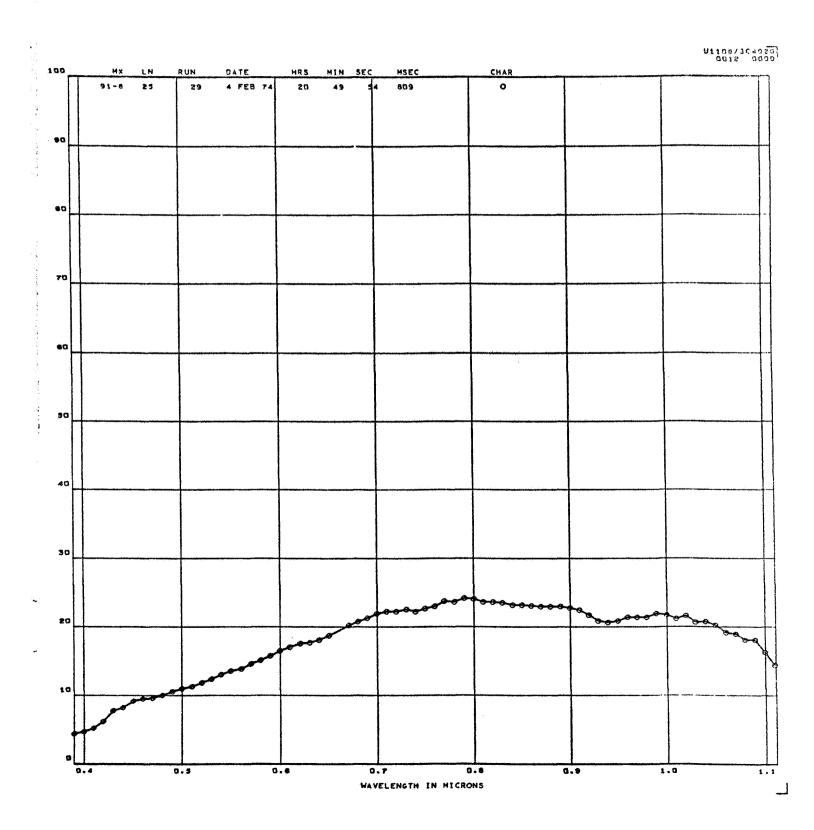
.*• .*	GROUND TRUTH DATA							
	DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS		
	Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	1 2-3 3 4 6 7 7	3 4 15 8 8 10 10	Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 3" down Moist 2" down Dry	Sprouts emerging Normal Normal Normal Normal Normal	- 5% Weeds Thinned and weeded Jan 14, 1974 Salt on rows - Jan 21, 1974 No weeds		
· Copyright Control of the Copyright								



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



POPPY - 1 (Acquisition No. B-40-6-3)

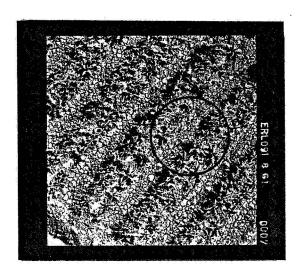
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2rows on 40" beds with 12" spacing and 9"
	spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion

POPPY-1 (Acquisition No. B-40-6-3)

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	1 1-1.5 2 3 4	1 4 12 22 15 18 30	Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 3" down Moist 2" down Dry	Wilted Normal	Thinned Dec 17 Tens. = 11 Salt on rows - Jan 21, 1974 No weeds, tens.=5
			i		
			,		

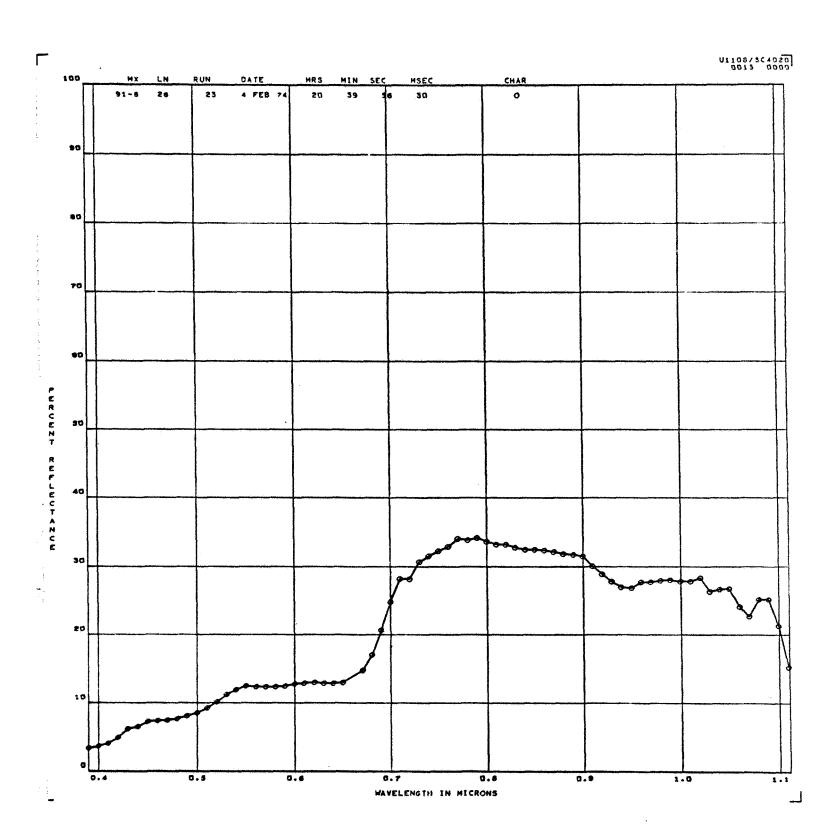


GROUND LEVEL



 $\label{eq:BORESIGHT} \textbf{Circle represents spectrometer footprint}$

POPPY-1



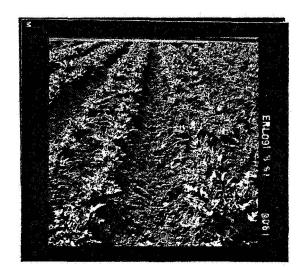
POPPY - 3 (Aquisition No. 371923)

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9"
	spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 19/4	Disced fallow portion

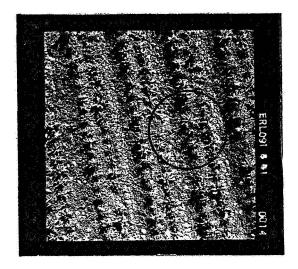
POPPY-3 (Acquisition No. 371923)

3						
	DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
	Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1 1 2 3 4	1 2 12 22 20	Moist 1" down - Moist .5" down Wet Moist 3" down	Wilted Normal Normal Normal	Thinned Dec 17 Few weeds 1% weeds Salt on rows -
•	Jan 30, 1974	4	15	Moist 2" down	Normal	Jan 21, 1974
- Community Community Manager Agency Community Communi	Feb 7, 1974		25	Dry	Normal	No weeds

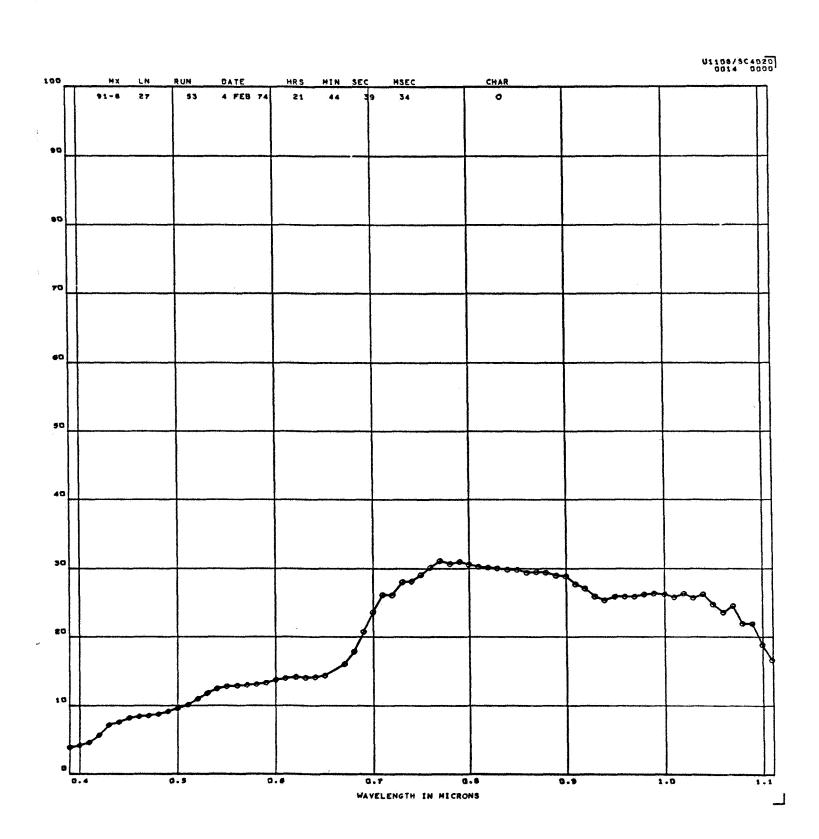
PLOT NO. 27 POPPY - 3



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



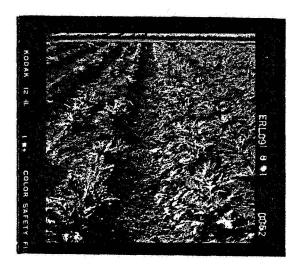
POPPY - 6
(Acquisition No. B-40-5)

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion

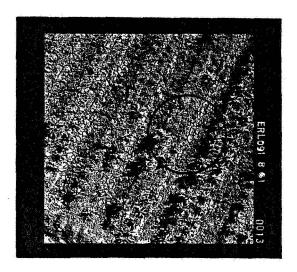
POPPY-6 (Acquisition No. B-40-6-3)

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	1 1 2 2.5 4 4	1 2 10 20 15 15	Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 3" down Moist 2" down Dry		Thinned Dec 17 Salt on rows - Jan 21, 1974 Sparse crop Poor stand, no weeds
		,			

FEBRUARY 4, 1974

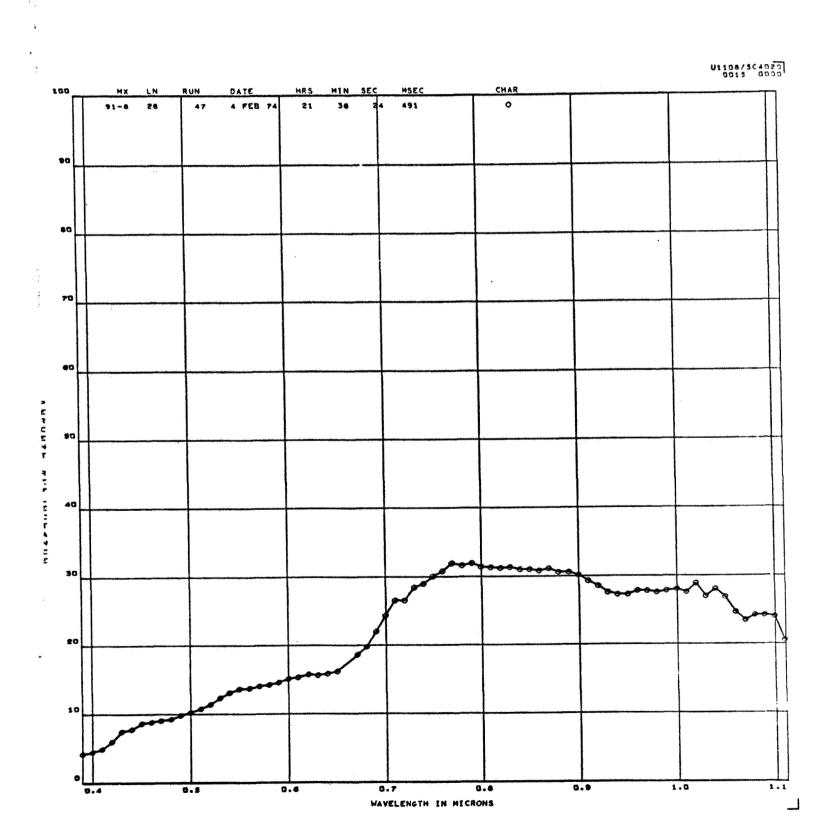


GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

na Janka

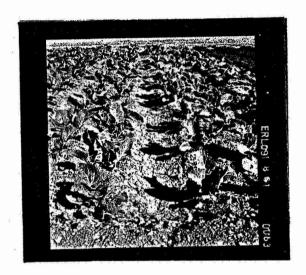


PLOT NO 34 CAULIFLOWER

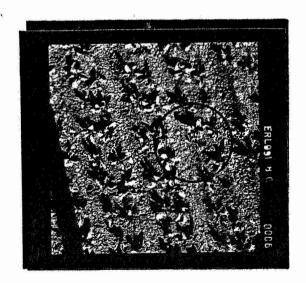
Nov	6,	1973	Fertilized with 50 lbs N/Ac
Nov	7,	1973	Planted 2 rows on 40" beds with 12" spacing and 24"
			spacing in drill
voll	9,	1973	Irrigated
Nov	13,	1973	First emergence
Nov	15,	1973	Up to a stand
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	17,	1973	Thinned to 24"
Dec	26,	1973	Cultivated
Jan	11,	1974	Sidedressed with 50 lbs N/Ac
Jan	15,	1974	Irrigated
Jan	28,	1974	Hoed weeds
Jan	29,1	L974	Disced fallow portion

CAULIFLOWER

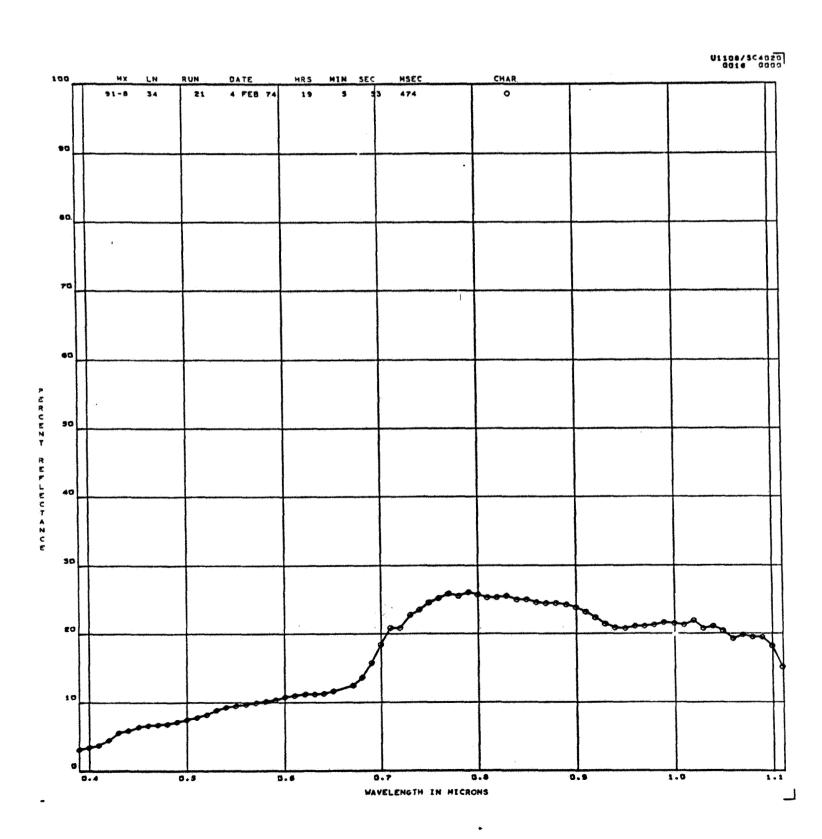
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1 2 6 6.5 8	1 2 12 15 20	Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 3" down	Wilted Normal Normal Normal	Thinned Dec 17 2% weeds Salt on rows - Jan 21, 1974
Jan 30, 1974 Feb 7, 1974	9 12	20 30	Moist 2" down Dry	Normal Normal	Jan 21, 1974 - No weeds
		•			
					-
	,				
•				:	



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



PLOT NO. 35 CARROT

CROP HISTORY

Nov	6,	1973	Fertilized with 50 lbs N/Ac
Nov	7,	1973	Planted 4 rows on 40" beds with 4-8-4 " spacing
Nov	9,	1973	Irrigated
Nov	21,	1973	Irrigated
Nov	26,	1973	First emergence
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	26,	1973	Cultivated
Jan	11,	1974	Sidedressed with 50 lbs N/Ac
Jan	15,	1974	Irrigated - Sprayed with Lorax
.Tan	28,	1974	Hoed weeds
Jan	29,	19/4	Disced fallow portion

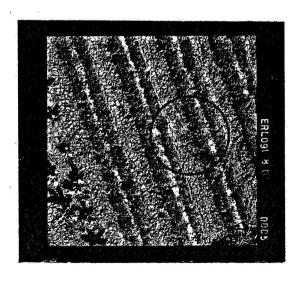
`

CARROT

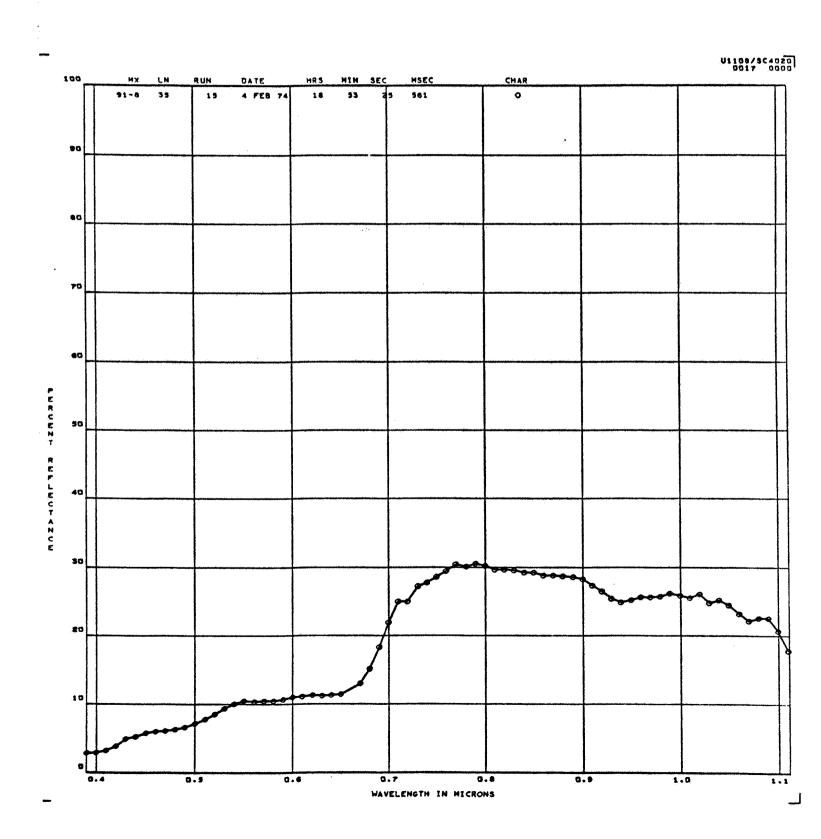
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	. 1	Moist 1" down	Sprouts emerged	•
Jan 3, 1974	-	-	Moist 1" down	-	, ÷
Jan 10, 1974	2 2 2 4	30	Moist .5" down	Normal	10% Weeds
Jan 14, 1974	2	.20	Wet	Normal	7% Weeds
Jan 25, 1974	4	33	Moist 3" down	Normal	3% weeds
					Tens. = 8 Salt on rows - Jan 21, 1974
Jan 30, 1974	4	,30	Moist 2" down	Normal	-
Feb 7, 1974	4	33	Dry	Norma1	No weeds, tens.=50
			- 1		
				•	
•					
				·	



GROUND LEVEL



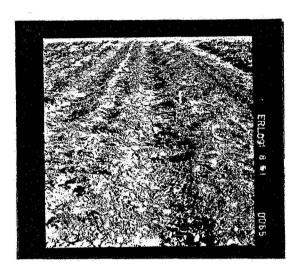
BORESIGHT
Circle represents spectrometer footprint



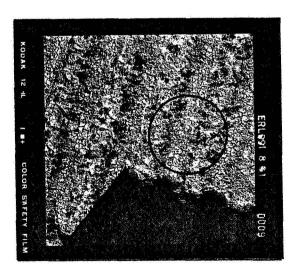
PLOT NO. 36 CHICK PEAS

Dec Dec Dec Jan Jan	4, 7, 26, 7, 11,	1973 1973 1973 1973 1974 1974	Fertilized with 50 lbs N/Ac Planted 2 rows on 40" beds with 12" spacing Fertilized with 50 lbs N/Ac - Irrigated First emergence Poor stand Sidedressed with 50 lbs N/Ac Transplanted for proper stand - Irrigated
Jan	28,	1974 1974	Hoed weeds Disced fallow portion

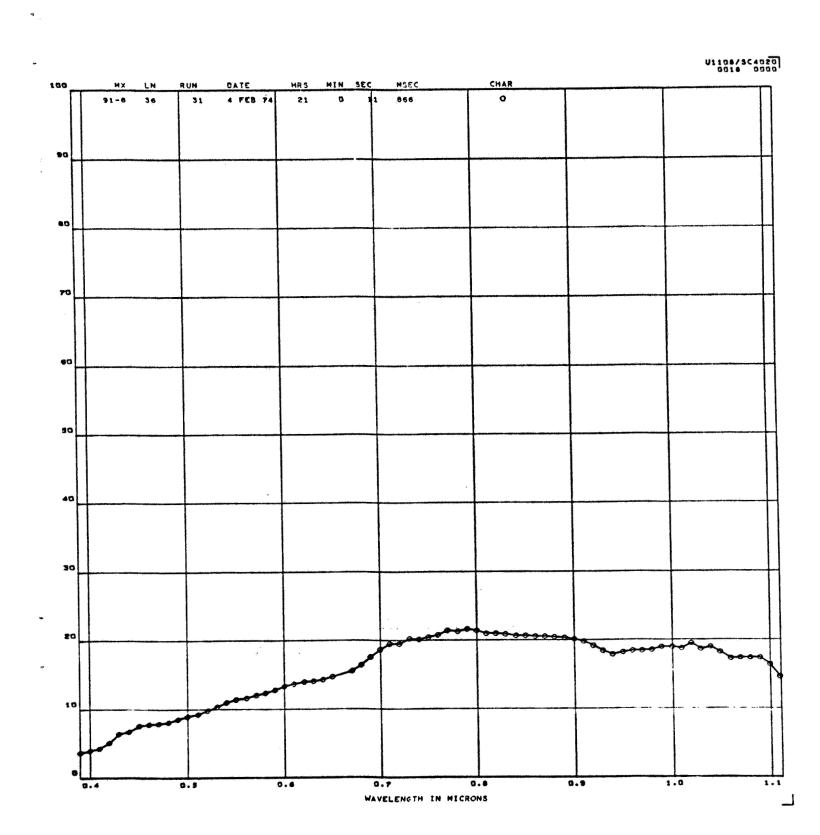
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974	- 1 2.5 4	1 3 6	Moist 1" down Moist 1.5" down Moist .5" down Wet	Normal Normal Normal	Not emerged Poor stand Transplanted for good stand
Jan 25, 1974	6	8	Moist 3" down	Normal	Salt on rows - Jan 21, 1974
Jan 30, 1974	6	7	Moist 2" down	Normal	
Feb 7, 1974	7	20	Dry	Normal	No weeds
- :	,				
3				,	
	•				
) }					
* 1					
		-			



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



POPPY - 2 (Acquisition No. M-89)

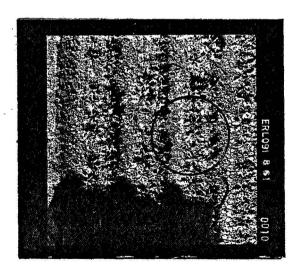
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion

POPPY-2 (Acquisition No. M-89)

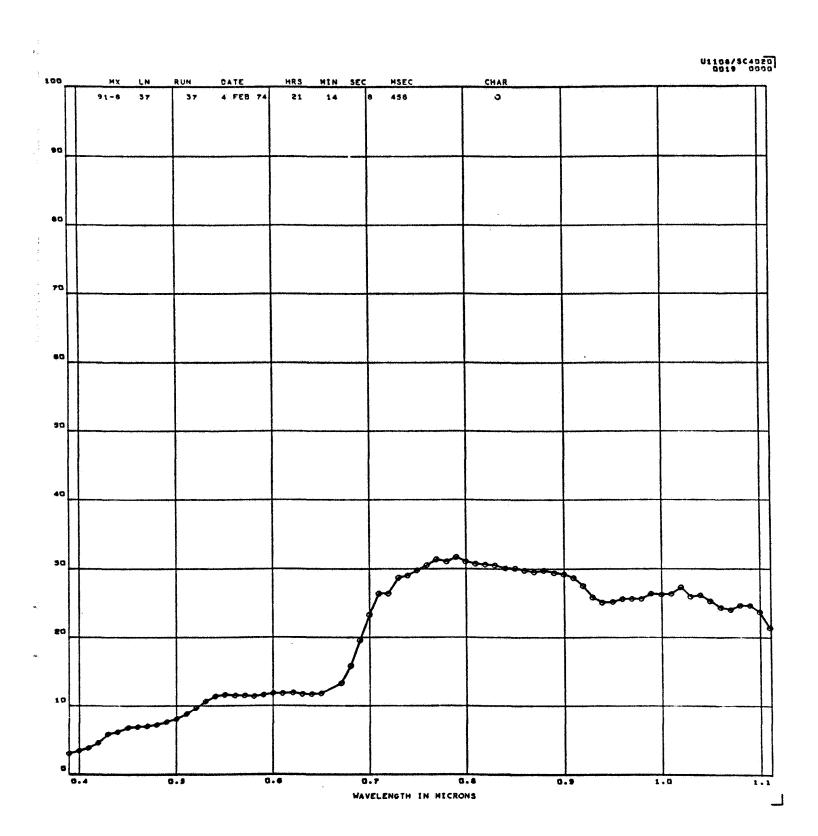
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1 1.5 2 3 4	1 2 10 22 15	Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 3" down	Normal Normal Normal	Thinned Dec 19. 5% weeds Salt on rows - Jan 21, 1974
Jan 30, 1974	6	15	Moist 2" down	Normal	-
Feb 7, 1974	7	30	Dry	Normal	No weeds
:					



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



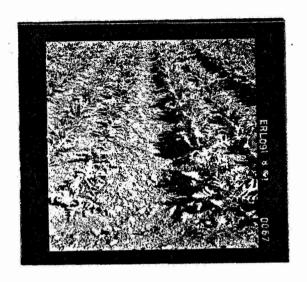
POPP7 ((**Mixture** of 1, 2, 4)

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1976	Hoed weeds
Jan 29, 1974	Disced fallow portion

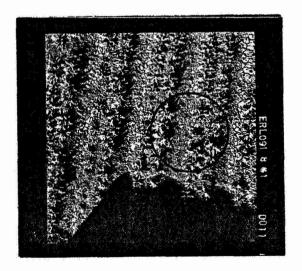
POPPY-4 (Mixture 1,2,3)

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS		
Dec 18, 1973 Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1 1.5 2 2.5 4	1 3 10 20 20	Moist 1" down Moist 1.5" down Moist .5" down Wet Moist 3" down		Thinned Dec 17.		
Jan 30, 1974	6	18	Moist 2" down	Normal	Salt on rows - Jan 21, 1974		
Feb 7, 1974	7	30	Dry	Normal	No weeds		
·							
		-					
er'							
			·				

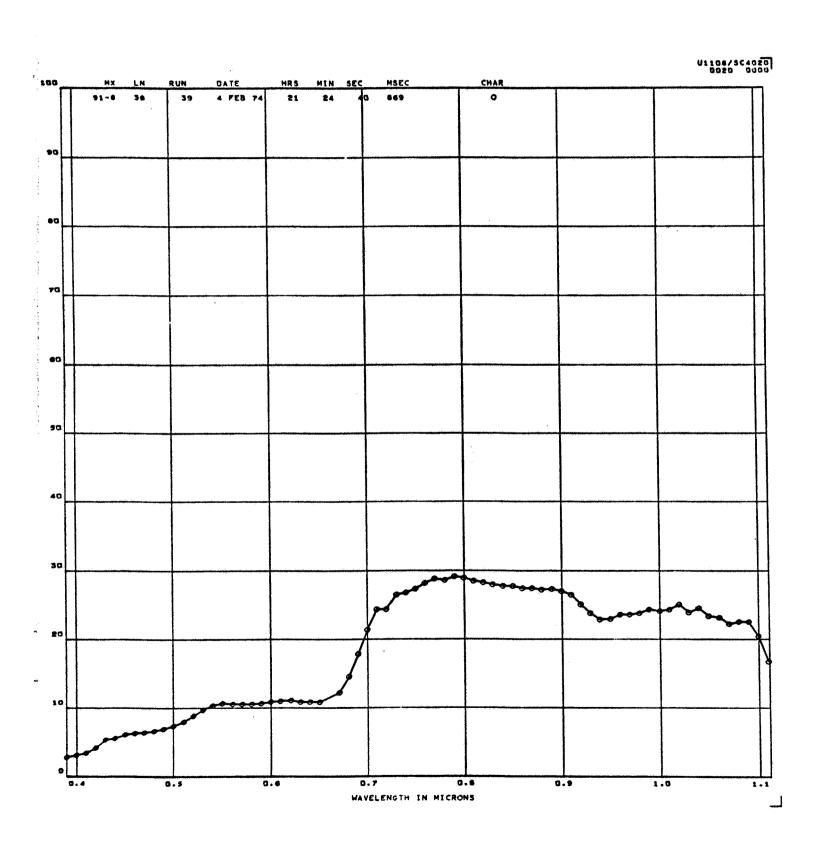
FEBRUARY 4, 1974



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint



BARE GROUND (DRY)

CROP HISTORY

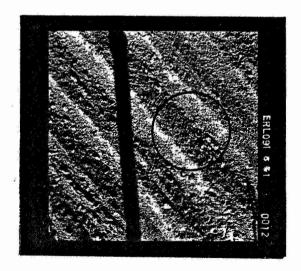
Nov	6,	1973	Fertilized with 50 lbs N/Ac
Nov	9,	1973	Irrigated
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	26,	1973	Cultivated
Jan	15,	1974	Irrigated
Jan	28.	1974	Hoed weeds
Jan	29,	1974	Disced fallow portion

	•				
DATE	CROP	GROUND	GROUND	CROP	, COMMENTS
22	HEIGHT	COVER	SURFACE	CONDITION	OOM ILLI
	(inches)	WER			
	(inches)	/0	CONDITIONS		
Dec 18, 1973	_	-	Moist 1" down	•	
Jan 3, 1974	-	_	Dry		No weeds
Jan 10, 1974	-	.0	Moist .5" down	· •	•
Jan 14, 1974	_	o	Dry		Not irrigated or
			,		cultivated
Jan 25, 1974	_	0	Moist 3" down		No weeds
Jan 23, 23, 4		•			Salt on rows -
•				-	Jan 21, 1974
Jan 30, 1974	_	_	Dry		-
		_	-		No weeds
Feb 7, 1974	-				
				-	
•					
•					
		•			
			٥		
				Į	
	I				
į			1		

FEBRUARY 4, 1974

NOT AVAILABLE

GROUND LEVEL

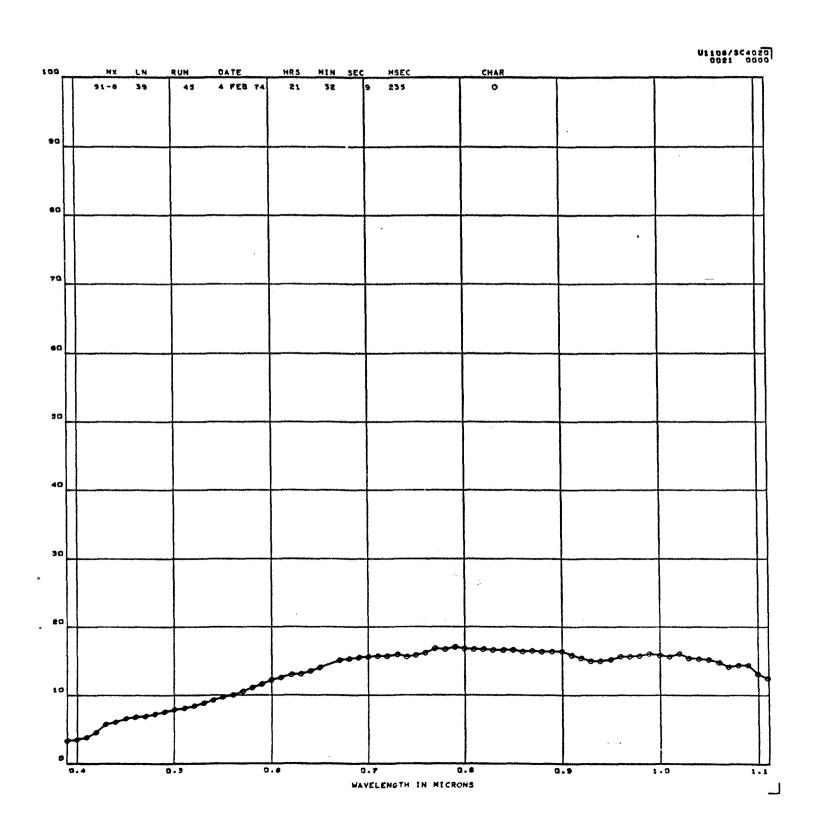


BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 39

BARE GROUND (Dry)

SPECTROMETER SIGNATURE



February 6, 1974

	MX	LN		RUN	DA	TE		HRS	MIN	SEC	:	MSEC		CHAR	CROP	U1106/50 0022
-	91-6	.3	- 1	93		FEB	74	17	33	1	1	628	1	0	CABBAGE	
	91-6	2	- 1	99	6	FEB	74	17	42	:	5	182	- 1	x	BROCCOLI	
	91-8	3		111	6	FEB	74	18	46		8	511		ô	ONIONS	
1	91-8	. 4	1	109	6	FEB	74	1.8	43	1	1	255	- 1	Y	POPPY-I	1
1	91-8	. 3	- 1	119	5	FEB	74	20	6		9	494	- 1		POPPY- 3	
+				417		FER.	74	20		3	<u>. </u>	960			BARE GROUND	
1	91-6	12		101	6	FEB	74	17	49	2	6	493		L	CAULIFLOWER	7
	91-8	13		1.03	6	FEB	74	1.8	19		5	653	- 1	ŭ	CARROT	
1	91-8	14	- 1	195	- 6	FEB	74	18	35	7	1	695	- 1	ů.	CHICK PEAS	1
	91-8	1.5	- 1	107	6	FEB	74	18	39	2		125		Н	POPPY-Z	
1	91-8	16		113	6	FEB	74	18	54	7	1	596	- 1	ë	POPPY-4	
╅			-	119-		FED.		- 10			_	-302	_	<u> </u>	1	<u> </u>
													1	•	POPPY - 6	
١			- 1				1						-		1	
l													- 1			1
十	·	· · · · · · · · · · · · · · · · · · ·		,	,	····	+		************************		_		_			
							1						1			
T	*******		1	***************************************	-		1				-		-		-	
							1					ب بر	~	-		1
\downarrow				-		·		·						THE REAL PROPERTY.	-	
												-			X	
			- 1				-					f	- 1		1	
												/			1	
+			\dashv				+				3-		-		X	1
											II					1
1			- 1				- 1				1/	ببسمر.	-	***************************************	1	
1			1				-1				ľ		لعا	The Standing Stands		1
1										1		Y was	\square	Name of the last o	T	>
+										/		11/1		***	* * * * * * * * * * * * * * * * * * * *	
			- 1				ł				*	1 Janes	T		Mary Comment	+++
1			- 1				ı			1	سير/ إ	18 The second	- 1		XIII	
1			- 1				1			ſ	16	<i>4</i> .			No.	The same
1							1			1	Y /	4	-	-	THE PARTY OF THE P	The state of the s
			1				1			* *	¥	The same	*	-	-	1
T							-		-		-	19	-		2	V 3-
1											-	/	لم		1	
							سؤي	-	*	3	12	ALC: NO.			Acres of the same	2011
				ノ	-	-					-				200000	
			1		-					11			- 1			200
L			ينيس	The same	ان		سا	-		10			- 1		1	1
T	-0	-			-		~ =	-			· · · · · · · · · · · · · · · · · · ·		-			
1	1			. •	وشوش				مستند	1			- 1		1	1
يط	2	-	-	الموسخاس									- 1		1	
T.	يشتهسوس كصبر	المراسا					İ			-			- 1		1	1
ø	-						1			-						
1				-			┸									1
. 4			0.5				0.6			0.						

February 6, 1974

U1108/SC	CROP	CHAR	MSEC	SEC		HRS		S FEB	109	L'N .	91-8	Т
	POPPY-1	0	255 494	1	43	16	74	6 FEB	119	,	91-6	
CWET	MARE GROUND	×	960	4	ĭ	sa	1 74	6 FEB	117	-6	91-6	
LWEIT	POPPY- Z	1 🔻	125].	39	1.8	,	6 FEB	107	15	91-8	
	POPPY - 4	'	306		54	18		6 FEB	113	. 16	91-8	
	POPPY-6		362		- 50						-01-0	
	,					^	_		-			•
						-) , - 4, -, -, -	-	.,	· · · · · · · · · · · · · · · · · · ·	
						k. ·						
	*		-		***************************************	-						
			17		· · · · · · · · · · · · · · · · · · ·		\dashv	·	+			
					, in the di -		-		.	······································		
		***	,									
		******	Jan.				_			y 10 mg - 11 mg	- 	
	-		The state of the s									
- Alexander			00.000				\bot					
2000	3335000				منسم <i>و</i> د	e e e e	98	-				
			ndę ne wie odoczają						A STATE OF THE PARTY OF THE PAR	0000	مهو	
.0	0.9			0.7			0.0		0.5		· •	

February 4, 1974

U1108/S	CROP	CHAR	MSEC	SEC	ман	HRS	DATE	UN	LN	MX
	CABBREE	0	40	35	37	18	FEB 74	7	5.2	91-8
	BROCCOLI	×	237	35	47	18	FEB 74	13	24	91-8
	ONIONE	a	809	4	49	20	FEB 74	29	52	91-8
	POPPY-1	Ÿ	30	36	39	20	FEB 74	23	26	91-8
	POPPY-3	•	34	39	44	21	FEB 74	53	27	91-6
· · · · · · · · · · · · · · · · · · ·	POPPY-6		404	_1		21	FE1 74	47	30	
	GAULIFLOWER	L	474	43	5	19	4 FEB 74	21	34	91-6
	CARROT	U	561	45	53	18	4 FEB 74	1.5	35	91-8
	CHICK PEAS	0	866	1	0	21	4 FEB 74	31	36	91-8
	POPPY-Z	H	45A	a	1.4	21	4 FEB 74	37	37	91-8
	POPPY-4	ĉ	869	40	24	21	4 FEB 74	39	38	91-6
110UL	MARK GROUND	·····	235		<u>3e</u>		+ FED T+		-39	
							·			
, and the state of the state o			wydr _{ae} udyddiaeth a fir odyddiaeth dyddiaeth		, , , , , , , , , , , , , , , , , , , 					
		depart of the first special special continued to the con	ngianggi ga kip to kepi kepilan mining kepilan da	-	·			······································		
				\dashv		· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	nite a nice i popino no con
						· · · · · · · · · · · · · · · · · · ·			······································	
		The state of the s		- 1			- 1			
	1			- 1			1			
*	126	A PARTY COMPANY								
***	The same of the sa	-	FER	J						
			Market Street	1						
	the franch	The state of the s	مسوسمون	H						
The said of	A Park		A COLOR	F						
1	A CARLES	A	-	2916	لو					· · · · · · · ·
	The same of the sa			1.73	1					
The state of the s			المعلىلان	# 1		000				
				2				بسميد		
					-			ستسيس		ميمبر سيمو
.0	1.5	. 8		0.	···	. 6		5	·	,

February 4, 1974

U1108/3C4	CROP	CHAR	MSEC	MIN SE	HRS	DATE	RUN	LN	МX
	POPPY-1	o X	30	39 44	50	4 FEB 74	23	2,6 27	91-6
	POPPY-6	â	34 1 491	36	21	4 FEB 74	47	28	91-6
	POPPY-2	Ÿ	458	14	21	4 FEB 74	37	37	91-6
	POPPY-4	•	3 869	24	21	4 FEB 74	39	36	91-8
CPRY)	MARE GROWND		235		21	A FEB 74	1.0	. 30	-
						1			
						1	1		
						1			
						1			
 	<u> </u>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
						1			
1						1			
ì						į.	1		
						İ	1		
1						1			
T				·,·,·,·,·	····				
						ł	1		
	1					I	İ		
						1	1		
		Marie Company of the Assessment of the Company of t			-				
				was in prices and					
						1			
						[
						i	1		
						1	1		
									
1	1					l			
						1	1		
	ĺ						1		
1	4		ļ			1			
+		·		· · · · · · · · · · · · · · · · · · ·					
	1						1		
							1		
			-				1		
		000000	200						
		2220000				1	1		
1 8	FR. 20		1					···	
	Toppoor	-			ŀ	Ì			
-	The same of the sa	•	No.				I		
]	7-4		1		1		
-44			V		l		1		
					1				
. 1	J.	-			1				
The same of the sa	The same			44	-				
		1	1		***	-	1		
	1	1	1			9000	_2		
		<u></u>	ļ				-270		
1									
	1	1	1		1				1
			1		1		1		
	1	1	1		l		1		
	1	I					1		
	0.9	L	1		1				

POPPY - 1 (Acquisition No. B-40-6-3)

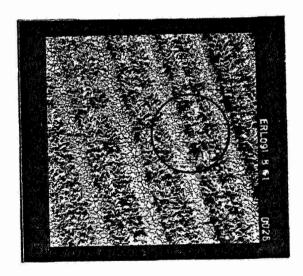
CROP HISTORY

Nov	6,	1973	Fertilized with 501bs N/Ac
Nov	11,	1973	Irrigated
Nov	13,	1973	First emergence
Nov	15,	1973	Up to a stand
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	19,	1973	Thinned
Dec	27,	1973	Cultivated
Jan	9,	1974	Hoed weeds
Jan	11,	1974	Sidedressed with 50 1bs N/Ac
Jan	14,	1974	Thinned double plants - Irrigated
Jan	28,	1974	Hoed weeds
Jan	31,	1974	6 cm test plants N - S too close, E - W 13", height 7"
			12 cm N - S too close, E - W 11", height 4.5 "

FEBRUARY 4, 1974



GROUND LEVEL



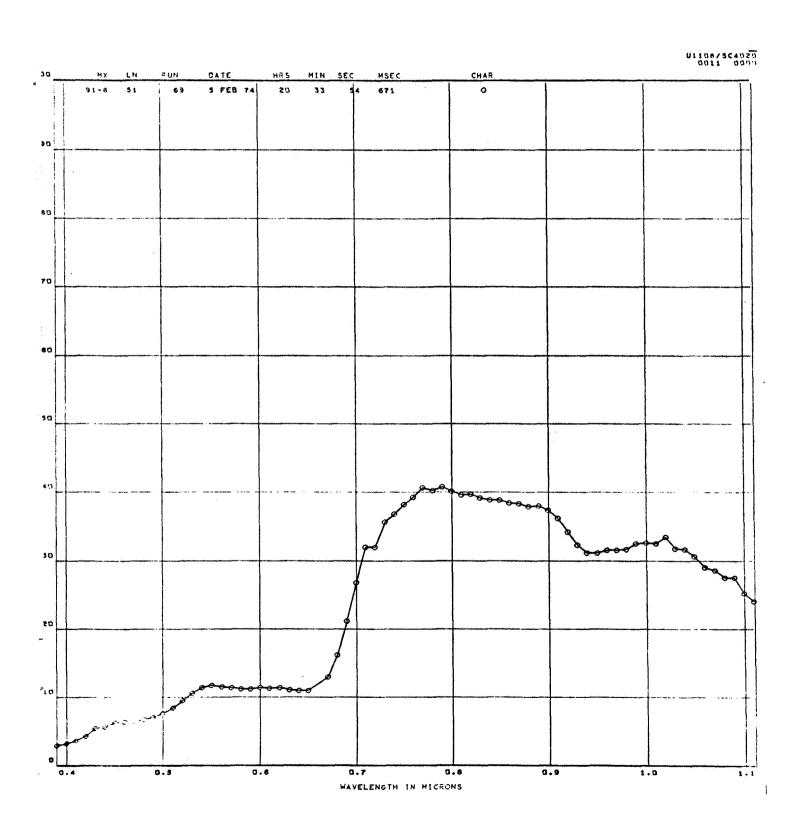
BORESIGHT
Circle represents spectrometer footprint

PLOT NO. 51

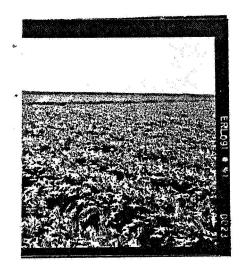
POPPY-1
(Acquisition No. B-40-6-3)
(6 cm spacing)

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	1 2 3 5 7 11	3 - 15 25 33 33	Moist 1.5" down Moist .5" down Wet Moist 1" down Moist 2" down Dry	Normal Normal Normal Normal Normal	No weeds Salt on rows - Jan 21, 1974 No weeds

SPECTROMETER SIGNATURE

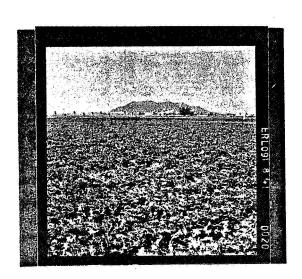


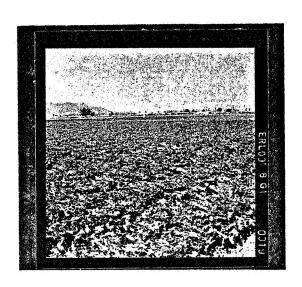
FEBRUARY 5, 1974











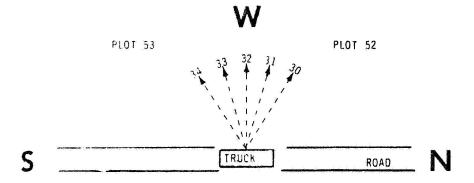


DIAGRAM INDICATES THE APPROXIMATE CAMERA ANGLES OF THE OVERVIEW PHOTOS ABOVE

FEBRUARY 5, 1974



VIEW NORTH
PLOT NO. 52
GROUND LEVEL



VIEW SOUTH
PLOT NO. 53
GROUND LEVEL

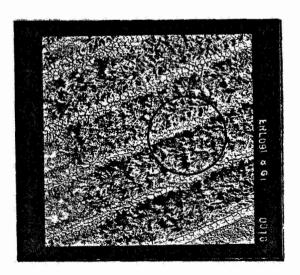
CROP HISTORY

Nov	6,	1973	Fertilized with 50 lbs N/Ac - Planted
Nov	11,	1973	Irrigated
Nov	13,	1973	First emergence
Nov	15,	1973	Up to a stand
Dec	7,	1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec	17,	1973	Thinned
Dec	27,	1973	Cultivated
Jan	9,	1974	Hoed weeds
Jan	11,	1974	Sidedressed with 50 lbs N/Ac
Jan	14,	1974	Thinned double plants - Irrigated
Jan	28,	1974	Hoed weeds

FEBRUARY 4, 1974



GROUND LEVEL

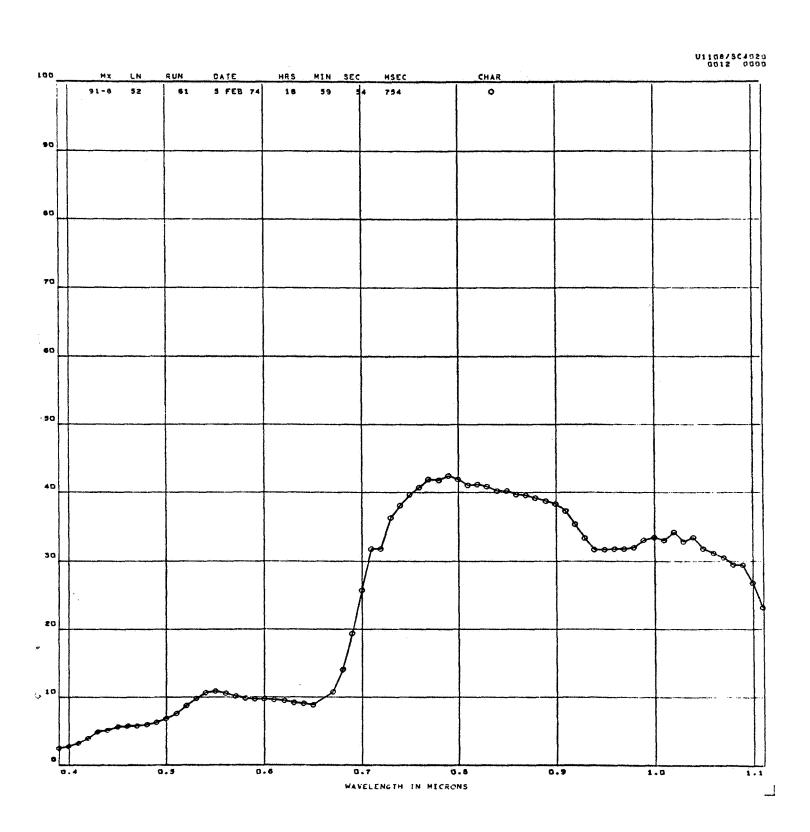


BORESIGHT
Circle represents spectrometer footprint

POPPY -·2 (Acquisition No. M-89) (18 cm spacing)

7	DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
	Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974 Jan 30, 1974 Feb 7, 1974	HEIGHT	COVER	SURFACE	CONDITION	No weeds Salt on rows - Jan 21, 1974 No weeds

SPECTROMETER SIGNATURE



POPPY - 2 (Acquisition No. M-89)

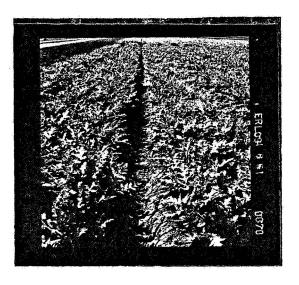
CROP HISTORY

Nov	6, 1	973	Fertilized with 50 lbs N/Ac · Planted
Nov 1	1, 1	973	Irrigated
Nov 1	3, 1	973	First emergence
Nov 1	5, 1	973	Up to a stand
Dec	7, 1	973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 1	9, 1	973	Thinned
Dec 2	7, 1	973	Cultivated
Jan	9, 1	974	Hoed weeds
Jan 1	1, 1	974	Sidedressed with 50 lbs N/Ac
Jan 1	4, 1	974	Thinned double plants - Irrigated
Jan 2	8, 1	974	Hoed weeds

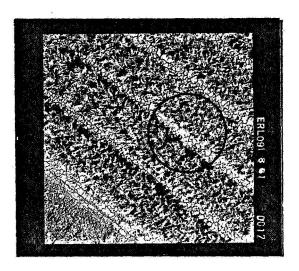
POPPY -2 (Acquisition No. M-89) (6 cm spacing)

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1.5-2.5 3 4 8	10 15 25 35	Moist 1.5" down Moist .5" down Wet Moist 1" down Moist 2" dwon		No weeds Salt on rows - Jan 21, 1974
Jan 30, 1974 Feb 7, 1974	9	37 60	Moist 2" dwon Dry	Normal Normal	No weeds

FEBRUARY 4, 1974

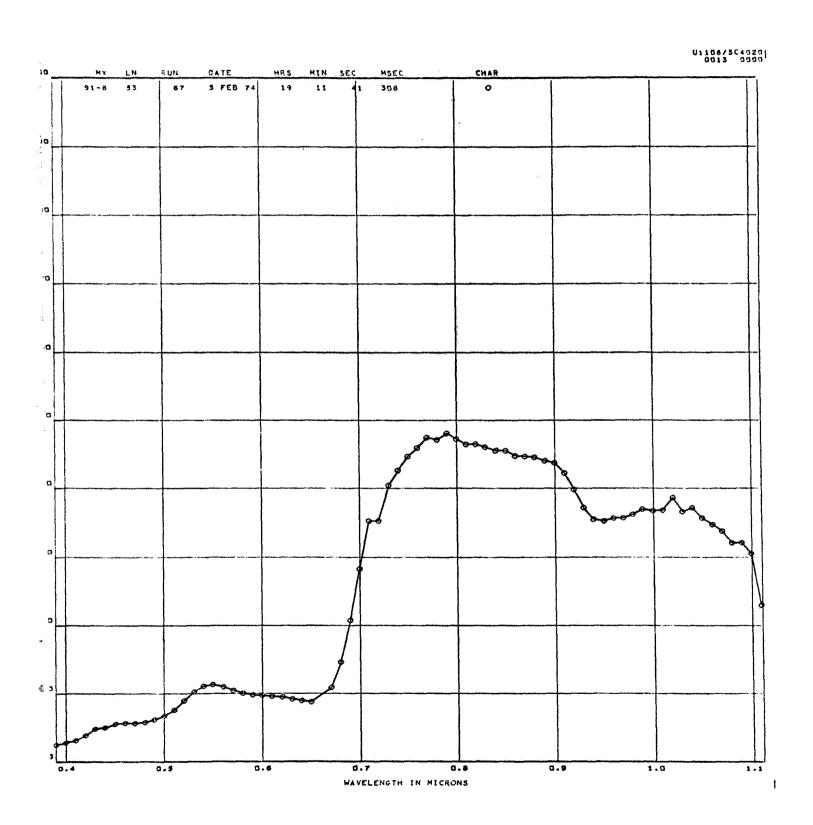


GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

SPECTROMETER SIGNATURE



CEOP HISTORY

Nov 6	1973	Fertilized with 50 lbs N/Ac - Planted
Nov 11,	1973	Irrigated
Nov 13.	1973	First emergence
Nov 15	1973	Up to a stand
Dec 7,	1973	Fertilized with 50 lhs N/Ac - Irrigated
Dec 21,	1973	Thinned
Dec 27.	1973	Cultivated
Jan 9	1974	Hoed weeds
Jan 11,	1974	Sidedressed with 50 lbs N/Ac
Jan 14,	1.974	Thinned double plants - Irrigated
Jan 28.	1974	Hoed weeds

POPPY-2 (Acquisition No. M-89) (12 cm spacing)

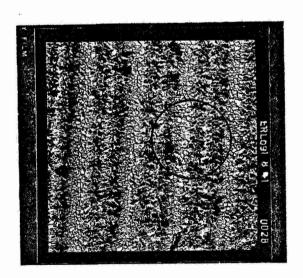
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Jan 3, 1974 Jan 10, 1974 Jan 14, 1974 Jan 25, 1974	1 2 3 4	5 10 15 20	Moist 1.5" down Moist .5" down Wet Moist 1" down	Normal Normal Normal Normal	No weeds Salt on rows -
Jan 30, 1974	6	23	Moist 2" down	Normal	Jan 21, 1974
Feb 7, 1974	10	40	Dry	Normal	No weeds
·					
j					

PLOT NO. 54 POPPY - 2

FEBRUARY 4, 1974



GROUND LEVEL



BORESIGHT
Circle represents spectrometer footprint

SPECTROMETER SIGNATURE

01108/3C4020 0014 0000 MSEC HRS MIN SEC CHAR DATE 5 FEB 74 241

WAVELENGTH IN MICRONS

POPPY - 1 (Acquisition No. B-40-6-3)

CROP HISTORY

PLOT NO. 55

Nov 6, 1973	Fertilized with 50 lbs N/Ac - Planted
Nov 11, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 27, 1973	Thinned - Cultivated
Jan 9, 1974	Hoed weeds
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 14, 1974	Thinned double plants - Irrigated
Jan 28, 1974	Hoed weeds
Jan 31, 1974	18 cm test plants N - S 12",E- W 14.5", height 5".

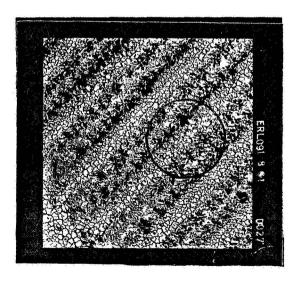
POPPY-1 (Acquisition No. B-40-6-3) (18 cm spacing)

DATE	CROP GROUND GROUND .			CROP	, COMMENTS
, DITT	HEIGHT	COVER	SURFACE	CONDITION	COMMENTS
	(inches)	%	CONDITIONS		
Jan 3, 1974	1	3	Moist 1.5" down	Normal	_
Jan 10, 1974	1 2 3	12	Moist .5" down	Normal	-
Jan 14, 1974	4	15 20	Wet Moist 1" down	Normal Normal	No weeds
Jan 25, 1974	4	2.0			Salt on rows -
Jan 30, 1974	6	20	Moist 2" down	Normal	Jan 21,1974
Feb 7, 1974	7	20	,		
reb /, 19/4	,	30	Dry	Normal	No weeds
			·		
				e	
:					
:					
	1				

FEBRUARY 4, 1974



GROUND LEVEL



BORES IGHT

Circle represents spectrometer footprint

SPECTROMETER SIGNATURE